emergency

MEDUMAT Easy CPR

Ventilator **WM 28140**

Service and Repair instructions

WEINMANN
medical technology

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Introduction

For decades WEINMANN has been developing, manufacturing and marketing devices for emergency medical care, oxygen therapy and inhalation therapy.

In 1972 WEINMANN put the first MEDUMAT emergency ventilator on the market.

MEDUMAT emergency ventilators are automatic ventilators. They are used for controlled ventilation in emergency medical care, e.g. in cases of acute ventilation disorders, and also secondary obstructions.

The new generation of devices, developed specifically to meet users' requirements and put on the market in 1997, offers users and patients increased security. An intelligent alarm system monitors the patient's breathing and informs the user about any problems that occur. These devices thus offer even greater security and reliability during ventilation.

The objective of these Servicing and Repair Instructions is to make you, an expert, familiar with the function, technology and repair of the MEDUMAT ventilator. Thanks to training which you have already received from WEINMANN, you now count as "trained expert personnel" and can therefore give your customers appropriate instructions, remedy problems on your own and perform the functional checks prescribed in the operating instructions and any repairs required in accordance with these Service and Repair Instructions.

In the event of a warranty claim, send the MEDUMAT to WEINMANN.

To enable us to process ex gratia requests or warranty claims, enclose the customer's proof of purchase (invoice) with the device.

Repairs or servicing work may be performed only by WEINMANN or by trained specialist staff.

You are responsible for repairs carried out yourself and for their warranty!

Use **only original WEINMANN spares** for repairs.

Bear in mind:
Your customer trusts you and relies on your expert capability, just as you rely on WEINMANN.

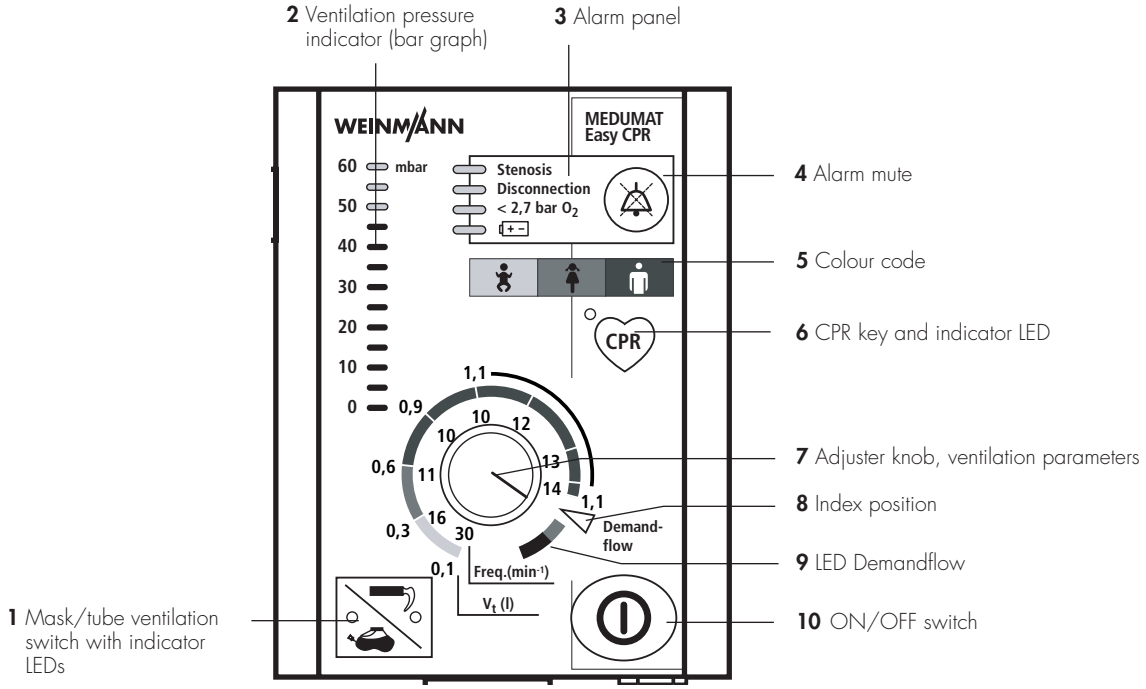
Note:

For the following informations, consult the Operating Instructions for MEDUMAT:

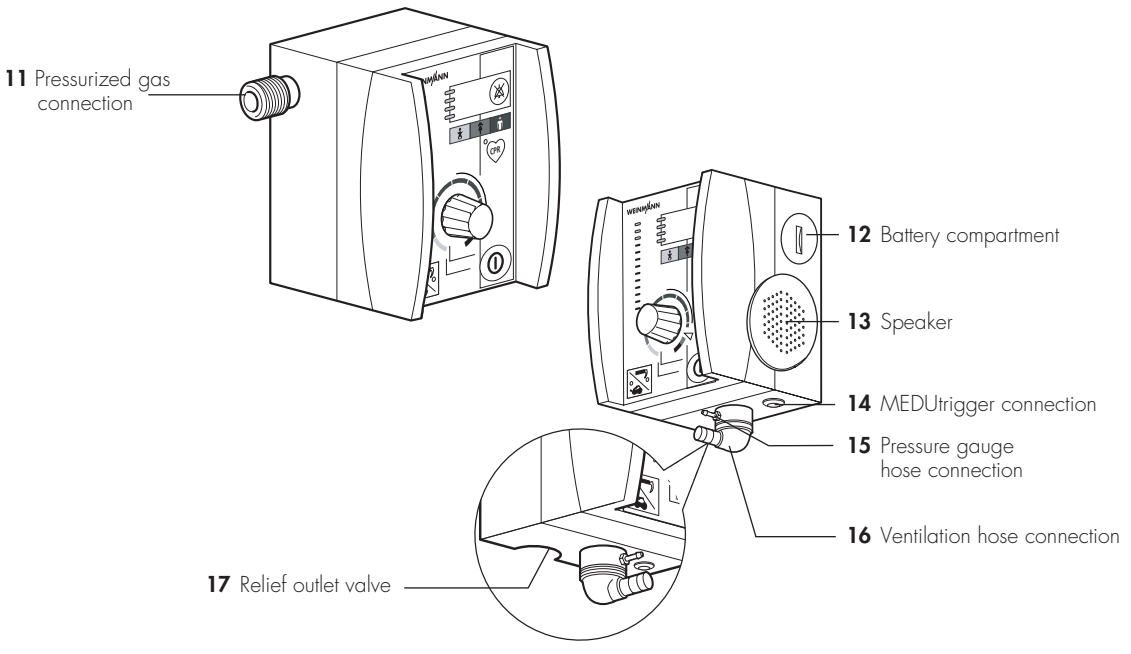
- Safety Information
- Fitting accessories
- Operating MEDUMAT emergency ventilators
- Hygienic preparation
- Functional check

1. Overview

Control panel MEDUMAT Easy CPR

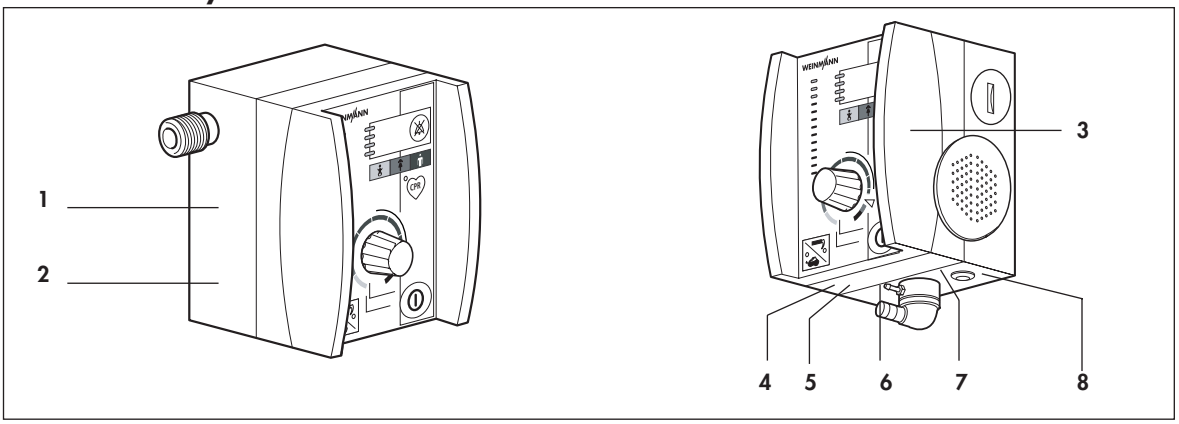


Connections MEDUMAT Easy CPR



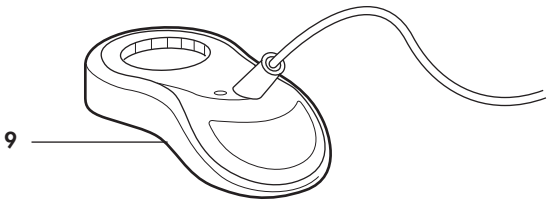
1.1 Special symbols on the ventilator

MEDUMAT Easy CPR



1	2,7-6 bar O_2	Inlet 2,7 - 6 bar O_2.
2	DE, GB, FR, IT, NL, ES PT, DK, SE, NO, FI, IS	Languages available for the device
	MEDUMAT Easy CPR device information plate	
3	**SN**	Serial number of device
		Year of manufacture
		3.6 V lithium battery
	CE 0197	CE symbol (confirms that the product conforms to the applicable European directives)
	IP54	Protection against ingress of water and dust
		Protection class BF
		Do not dispose of the device in domestic waste.
5		Patient circuit connection
6	Pmax ≤ 100 mbar	Maximum pressure ≤ 100 mbar
8	MEDUtrigger	Indicates where to connect the MEDUtrigger
	Safety check and servicing labe	
7		Servicing label: indicates when the next service is due.
4		Safety check label: (in Germany only) marks when the next safety check as per §6 of the German law relating to users of medical devices is required.

MEDUtrigger



MEDUtrigger device information plate		
9		BF protection class
		Do not dispose of the device in domestic waste
	CE 0197	CE symbol (confirms that the product conforms to the applicable European directives)
	IP54	Protection against ingress of water and dust
		Protection class II, protective insulation
		Date of manufacture

2. Description

2.1 Uses

MEDUMAT Easy CPR is an automatic oxygen ventilation device (short-term ventilator) with additional inhalation facility.

You can use MEDUMAT Easy CPR:

- to revive patients at the site of the emergency;
- for longer periods in more protracted emergencies;
- for short-term O_2 inhalation using a ventilation mask.

You can use MEDUMAT Easy CPR while transporting patients:

- between the various rooms and departments of a hospital;
- between the hospital and other premises;
- in emergencies;
- when transport over considerable distances is planned.

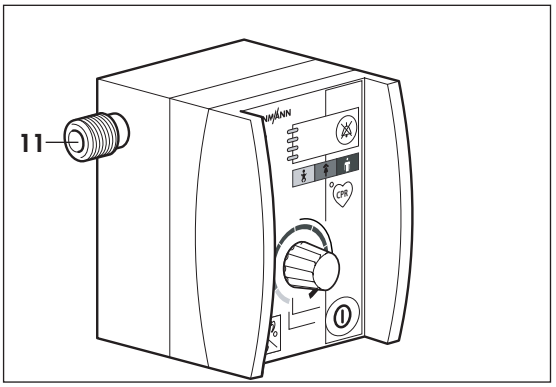
MEDUMAT Easy CPR:

- is designed to provide controlled ventilation to persons of 10 kg body weight or more;
- is used to treat ventilation arrest;
- can be preset to parameters that ensure evenly balanced ventilation, provided that the selected maximum ventilation pressure P_{max} is not exceeded;
- permits breathing-controlled oxygen inhalation in Demand mode;
- enables the user to initiate individual ventilation strokes in CPR mode.

2.2 Ventilation function

MEDUMAT Easy CPR operates within a pressure range of 2.7 to 6 bar and at a flow rate of not less than 70 l/min O_2. It has a built-in power supply.

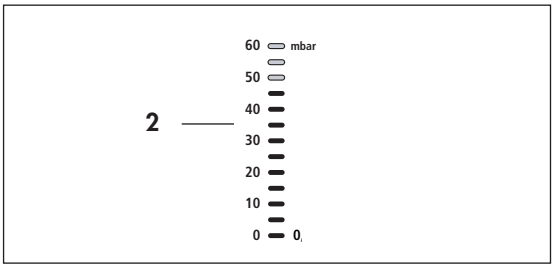
It uses high-pressure, medicinal-grade oxygen. An external pressure reducer brings this down to the required operating pressure. The oxygen supply is fed in at input valve **11**.



The infinitely adjustable ventilation values (frequency and tidal volume are linked) and the inspiration/expiration ratio of 1:1.67 are regulated by internal electronic control mechanisms.

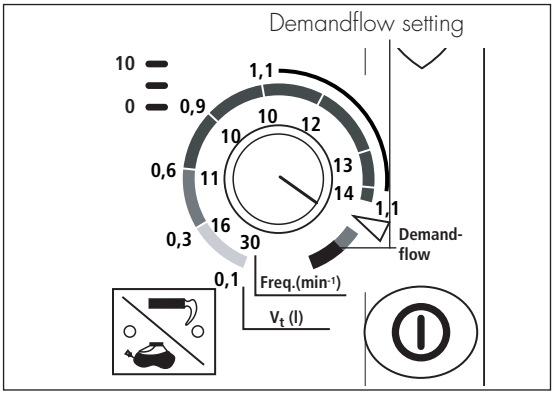
The gas for inspiration flows along the hose and through the patient valve and either the mask or tube into the patient's airways. The patient valve is fitted with a lip membrane that enables expired gas to be conducted away through the expiration tube.

You can check the course of ventilation on the ventilation pressure indicator **2**.



2.3 Demandflow function

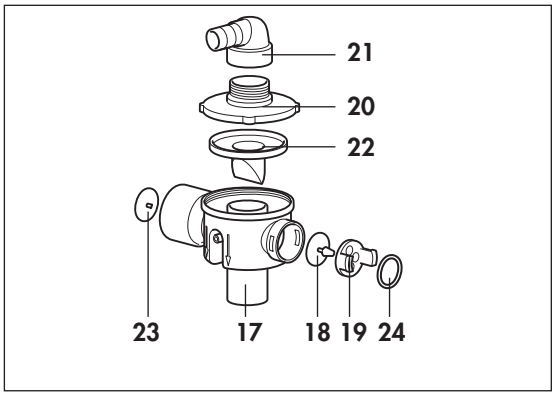
The Demandflow setting switches the MEDUMAT Easy CPR to breathing-controlled O_2 inhalation. Such inhalation must be carried out with the ventilation mask. A small inspiration (trigger) pulse causes oxygen to continue flowing until slight overpressure interrupts the flow. Expiration then takes place via the patient valve as in ventilation.



2.4 Patient valve

The gas for inspiration is channelled into the patient's airways through the patient valve.

The valve is designed to enable spontaneous breathing in the event of failure of the MEDUMAT Easy CPR.



2.5 Audio response

The device has an audio response facility which can be switched on for user guidance, especially for users with little practice.

The language can only be set if the device is switched off beforehand.

To select a language or to switch off the audio response facility, proceed as follows.

1. Hold down the mask/tube switch **1**.
2. Switch on the device at the ON/OFF switch **10**.
3. Now release the mask/tube switch **1**. The device is now in the language selection menu. The ventilation pressure indicator now displays the most recent language setting selected.

The following languages are assigned to the individual LEDs.

Device number	mbar	Language
WM 28140 WM 28150 (French variant)	60	Icelandic
	55	Finnish
	50	Norwegian
	45	Swedish
	40	Danish
	35	Portuguese
	30	Spanish
	25	Dutch
	20	Italian
	15	French
	10	English
	5	German
	0	Audio response off
WM 28160	60	Farsi
	55	Thai
	50	Indonesian
	45	Turkish
	40	Arabic
	35	Japanese
	30	Chinese
	25	Czech
	20	Russian
	15	Polish
	10	English
	5	German
	0	Audio response off

4. Now press the mask/tube switch **1** as many times as necessary until the LED for the desired language lights up and a corresponding message is heard (example: 10 mbar LED, language: English, message: "Selected language: English."). After five seconds, the new selection is stored.

By pressing the ON/OFF switch **10** briefly you can store the language selection without waiting for five seconds.

Select the setting 0 (0 mbar) if you want to switch off the audio response facility. You will then hear the message: "Audio response is off!" in the language most recently selected.

After approx. 5 seconds, the new setting is automatically stored. The LED for the selected language/setting goes out.

2.6 Switching the metronome on and off

1. With the device switched off, press and hold the CPR key.
2. Press the On/Off switch **10** briefly.
3. Release the CPR key.
4. Press CPR key.

   50 mbar LED (red) comes on:
   the metronome is activated
   45 mbar LED (green) comes on:
   the metronome is deactivated
5. Press the CPR key to change the operating state of the metronome.
6. Press On/Off key **10** to confirm the operating state of the metronome.

   1 x audible confirmation:
   metronome deactivation is confirmed
   2 x audible confirmation:
   metronome activation is confirmed

3. Final check

The device must be subjected to a final check after every repair and every service.

Note:
For the final check on MEDUMAT Easy CPR, you must connect the ventilation tube and the patient valve to the device.

MEDUMAT Easy CPR must not be used if the final check reveals defects or deviations from the specified values.

We recommend always keeping the following in stock:

- replacement seals for the device connections;
- lip membrane for the patient valve;
- membrane for the spontaneous breathing tube;
- membrane for the expiration tube.

3.1 Test material required

- Flow meter PF 300 from imtmedical, type EKU VIP, or comparable test device
- Adjustable orifice, e.g. ball cock, internal diameter ≥ 10 mm
- Test kit for function check WM 15357
- Oxygen concentration measuring device, 0 – 100 % ± 1 %, e.g. type Oxycontrol WM 13550
- Tube set with syringe WM 15359
- Pressure measuring device 0 - 6.3 bar, Class 1.6
- Pressure measuring device 0 - 100 mbar, Class 1.6
- Set, power supply test for Medumat / Module WM 15440
- Test adapter WM 20907

Default settings for flow meter PF300

Settings	Values
Default settings: – Type of gas – Gas standardization	 Air/O_2 auto STP
Trigger settings: – Type of ventilation – Source – Start – End – Delay – Base flow rate	 Adult Internal HF Flow rate ≥ 3.0 l/min Flow rate ≤ 3.0 l/min 60 ms Disabled
Units and measured values: – P high – P diff – Rate – V_{ti} – O_2	 bar mbar b/min ml %

If you have a comparable testing device, contact Weinmann Technical Support to have the setting parameters calibrated.

3.2 Preparation for the final check

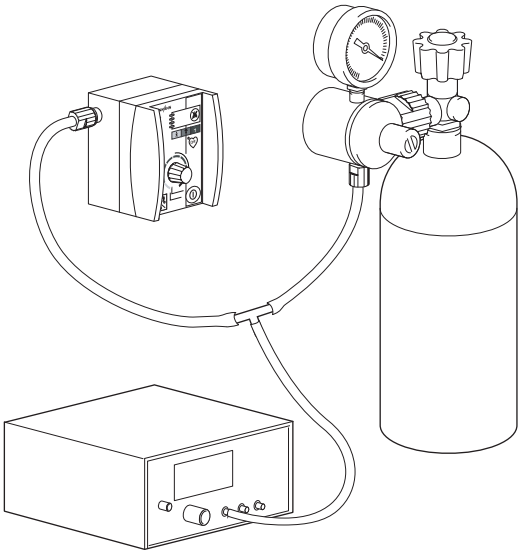
1. Device setting freq. = 30 min^{-1}, V_t = 0.1 l
2. Check which language is set. Record setting.
3. Switch on audio response (see "2.5 Audio response" on Page 9).
4. Check whether the metronome is on or off (see "2.6 Switching the metronome on and off" on Page 11). Record setting.

3.3 Enter device data

1. Enter the device data from the device information plate in the test protocol and check the device information plate is complete and undamaged.

3.4 Check for leaks and check pressure display

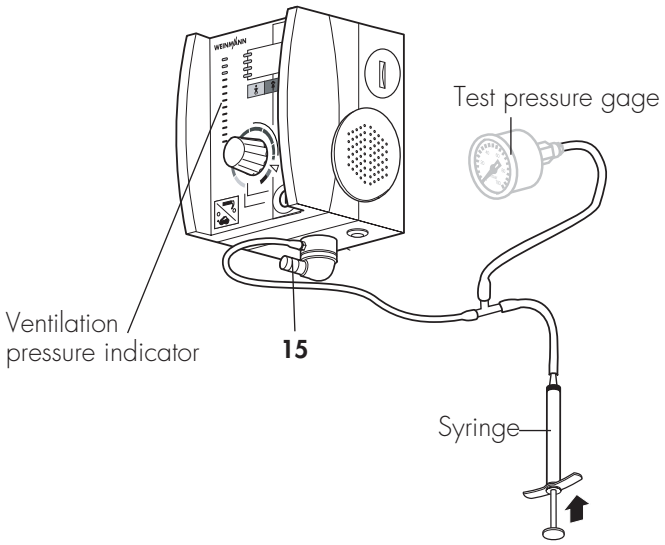
3.4.1 Check for leaks on inlet side



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Switch off device.
3. Open oxygen cylinder.
4. Close oxygen cylinder.

   Requirement: Drop in pressure must be less than 0.2 bar/min.

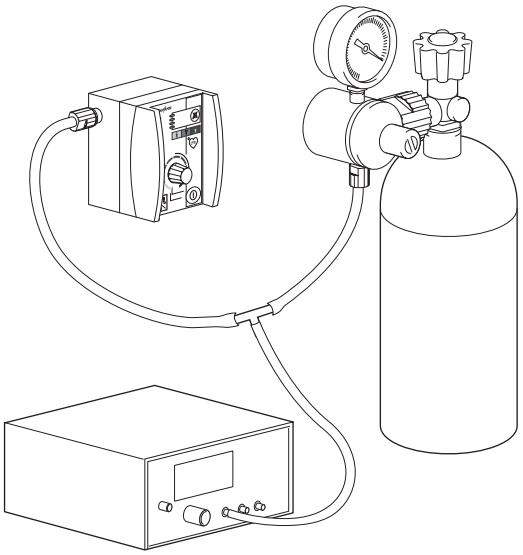
3.4.2 Check for leaks in pressure measuring section



1. Put T-tube connection with syringe (WM 15359) on the pressure measurement tube connection **15**.
2. Use the syringe to generate a pressure of 55 mbar ± 2 mbar on the test pressure gage.

   Requirement: Drop in pressure must be ≤ 2 mbar/min.

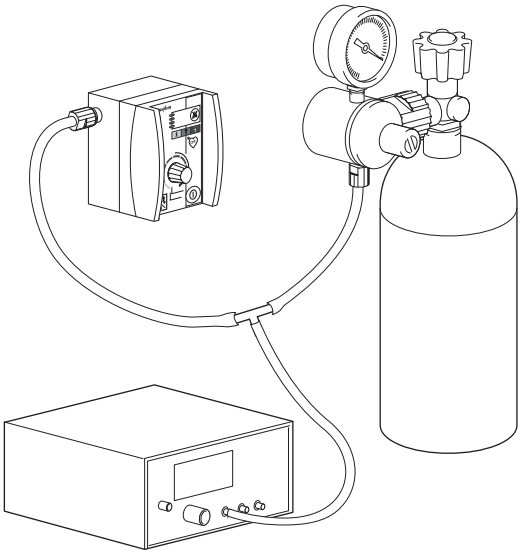
3.5 Self-test after the device is switched on



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Connect the patient circuit to MEDUMAT Easy CPR.
3. Open oxygen cylinder.
4. Switch on device.

   Requirement: The self-test is triggered, the ventilation mode LEDs light up once each in turn, the alarm LEDs flash, the pressure indicator LEDs are run through 3x, a signal sounds and one sentence is issued by the audio response.

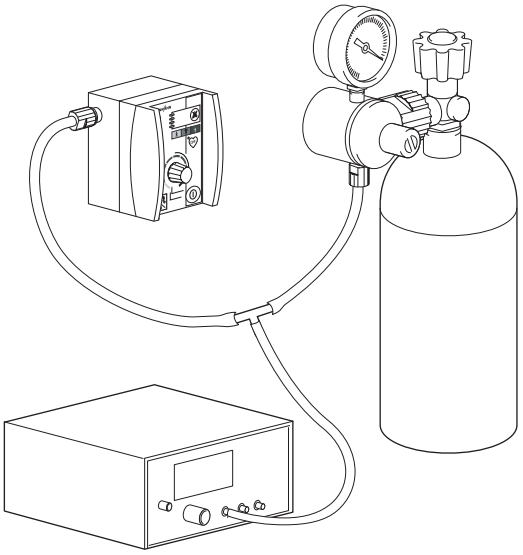
3.6 Function check of controls (key test)



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Open oxygen cylinder.
3. Switch on device.
4. Switch from mask ventilation to tube ventilation.
5. Press the alarm mute button **4**.
6. Press the CPR key **6**.

   Requirement: All the controls must work perfectly.

3.7 Function check and alarms



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Open oxygen cylinder.
3. Switch on device.

3.7.1 Test stenosis alarm

1. Switch to tube ventilation ( ) and seal off the patient valve outlet.
2. Operate device at setting freq. = 30 min^{-1} and V_t = 0.1 l .

   Requirement: The stenosis alarm must be triggered after 2 ventilation operations. The red LED of the stenosis alarm must come on. The device issues the message "Check airways and settings!".

3.7.2 Test alarm mute function

1. Immediately after the first alarm tone sounds, press the alarm mute key **4**.

   Requirement: The acoustic alarm must be suppressed immediately. The visual alarm continues to flash.

Alarm	Suppression time
Stenosis	30 seconds
Disconnection	30 seconds
< 2.7 bar	30 seconds
+ –	120 seconds

3.7.3 Test disconnection alarm

1. Open patient valve outlet.

   Requirement: The disconnection alarm must be triggered after 2 ventilation operations. The device issues the message "Check ventilation system and settings!".

3.7.4 Test pressure alarm

1. Shut off pressurized gas connection of device (2.7 - 6.0 bar).

   Requirement: The pressure alarm must be triggered. The device issues the message "Check pressure hose system and gas supply!".

3.7.5 Test demand mode LED

1. Open compressed air supply.
2. Select "Demand flow" setting.

   Requirement: Demand mode LED must come on (flicker).

3.7.6 Test audio response

1. Turn knob back to the "Ventilation" range. The device issues the message "Ventilation pressure limit 20 mbar".
2. Select "Demand flow" setting.

   Requirement: The audio response must be clear and intelligible.

After the test

3. Switch off device
4. Close oxygen cylinder.
5. Disconnect pressurized gas supply from device.

3.8 Battery voltage

3.8.1 3.0 V battery (board)

As the 3.0 V lithium cell is hard to reach, its charge status can be called up both via the interface and via a corresponding menu.

1. Switch on device and simultaneously keep the alarm mute key depressed.

   The device is in battery control mode for 3 seconds and then switches to normal operating mode.

   Within these 3 seconds, the "Energy supply" alarm in the alarm field comes on and the measured voltage value of the lithium cell is displayed in the pressure bar graph.

   In the table you will find an assignment of bar graph values to battery voltage values.

Bar graph value (mbar)	Battery voltage (V)
60	3.21
55	3.19
50	3.17
45	3.15
40	3.13
35	3.11
30	3.09
25	3.07
20	3.05
15	3.03
10	3.01
5	2.99
0	2.97

   Requirement: Measured value for 3.0 V battery is in the range 3.0 to 3.2 V, the alarm for this cell is triggered at 2.7 V.

2. Switch off device.

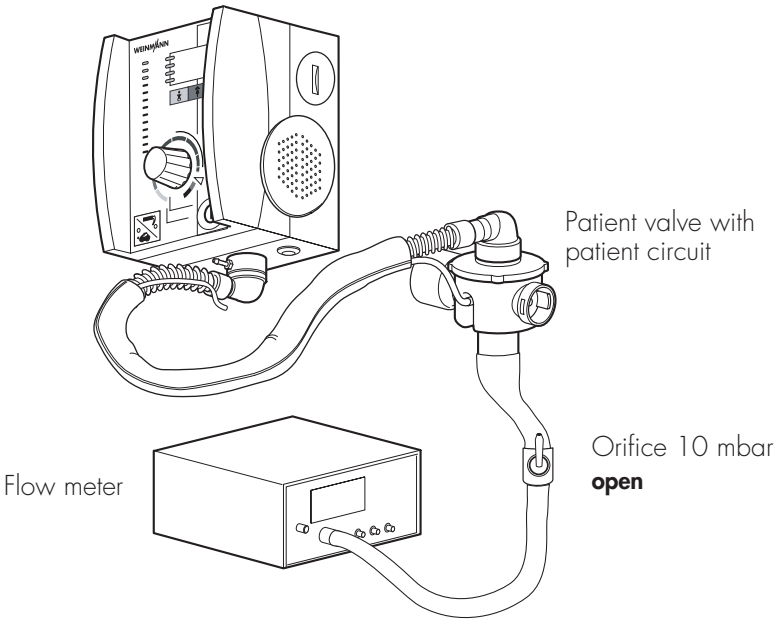
3.8.2 3.6 V battery (battery compartment)

1. Open battery compartment with a screwdriver.
2. Remove 3.6 V battery from battery compartment.
3. Measure voltage using a digital multimeter.

   Requirement: Measured value for 3.6 V battery is in the range 3.4 to 3.7 V.

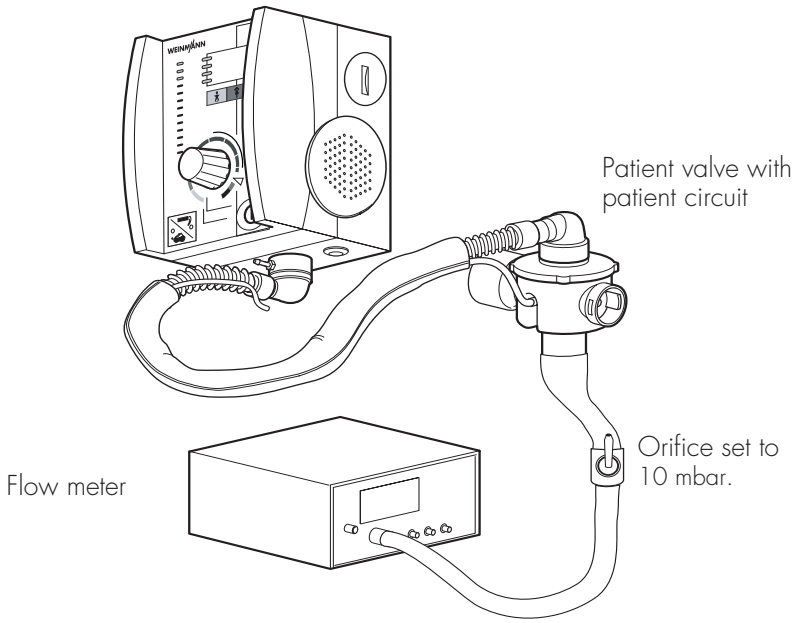
4. Put battery **27** back in device correctly.
5. Close battery compartment.

3.9 Function check of frequency setting



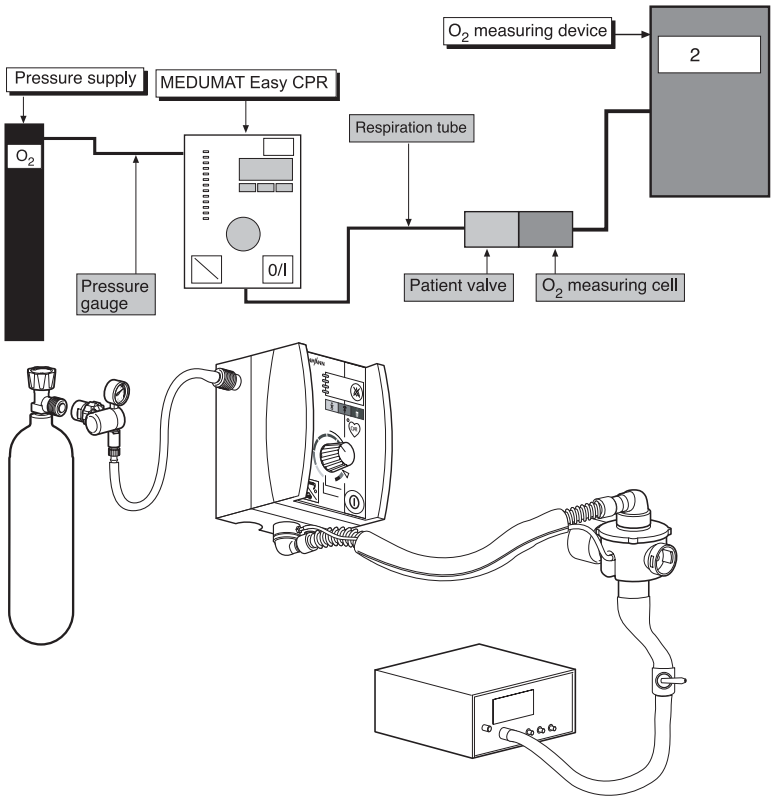
1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Open oxygen cylinder.
3. Switch on device.
4. Connect ventilation tube to 10 mbar orifice and to flow meter.
5. Operate device at setting freq. = 14 min^{-1} and V_t = 1.1 l.
   Requirement: Frequency must be 14 ± 2 min^{-1}.
6. Operate device at setting freq. = 10 min^{-1} and V_t = 1.1 l.
   Requirement: Frequency must be 10 ± 2 min^{-1}.
7. Operate device at setting freq. = 30 min^{-1} and V_t = 0.1 l.
   Requirement: Frequency must be 30 ± 2 min^{-1}.
8. Switch off device.
9. Close oxygen cylinder.
10. Disconnect pressurized gas supply from device.

3.10 Function check of breath volume at 4.5 bar input pressure and 10 mbar back pressure



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Open oxygen cylinder.
3. Switch on device.
4. Operate device at setting freq. = 14 min^{-1} and V_t = 1.1 l.
   Requirement: Breath volume (V_{te}) must be 1140 ± 170 ml.
5. Operate device at setting freq. = 10 min^{-1} and V_t = 1.1 l.
   Requirement: Breath volume (V_{te}) must be 1100 ± 170 ml.
6. Operate device at setting freq. = 30 min^{-1} and V_t = 0.1 l.
   Requirement: Breath volume (V_{te}) must be 100 ± 20 ml.
7. Switch off device.
8. Close oxygen cylinder.
9. Disconnect pressurized gas supply from device.

3.11 Test O_2 concentration



1. Provide a pressurized gas supply to MEDUMAT Easy CPR and to the flow meter.
2. Open oxygen cylinder.
3. Switch on device.
4. Operate device at setting freq. = 10 min^{-1}, V_t = 1.1 l and 100 % O_2.
   Requirement: O_2 concentration must be > 98 %.
5. Switch off device.
6. Close oxygen cylinder.
7. Disconnect pressurized gas supply from device.

3.12 Function check of pressure limit

1. Provide pressurized gas supply to MEDUMAT Easy CPR.
2. Open oxygen cylinder.
3. Switch on device.
4. Put test bag with adapter from test set WM 15357 on patient valve.
5. Operate device at setting freq. = 10 min^{-1} and V_t = 1.1 l.
6. Switch device to mask ventilation.
   Requirement: The pressure limit must respond at 20 ± 5 mbar.
7. Switch device to tube ventilation.
   Requirement: The pressure limit must respond at 45 ± 5 mbar.

8. Switch off device.
9. Close oxygen cylinder.
10. Disconnect pressurized gas supply from device.

3.13 Function check of venting valve without patient valve

1. Provide pressurized gas supply to MEDUMAT Easy CPR.
2. Open oxygen cylinder.
3. Remove lip membrane from patient valve.
4. Put test bag with adapter from test set WM 15357 on patient valve.
5. Switch on device.
6. Connect device with expiration outlet sealed, without lip membrane and with test bag on device outlet port.
7. Operate device at setting freq. = 10 min^{-1} and V_t = 1 l (between 0.9 and 1.1).
8. Switch ventilation tube to the test bag.

   Requirement: The test bag is fully inflated during the inspiration stroke. The ventilator then vents audibly.
9. Switch off device.
10. Close oxygen cylinder.
11. Disconnect pressurized gas supply from device.

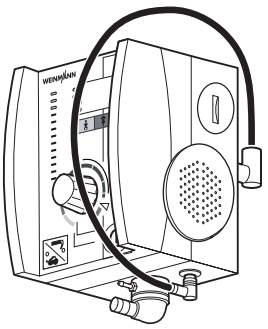
3.14 Test MEDUtrigger

1. Provide pressurized gas supply to MEDUMAT Easy CPR.
2. Open oxygen cylinder.
3. Put test bag with adapter from test set WM 15357 on patient valve.
4. Select setting freq. = 10 min^{-1}, V_t = 1 l (between 0.9 l and 1.1 l) and P_{max}= 20 mbar.
5. Connect MEDUtrigger to device.
6. Switch on device.
7. Press CPR key.

   Requirement: The LEDs on the MEDUtrigger come on.
8. Trigger a breath stroke manually using the MEDUtrigger key.

   Requirement: The test bag must inflate fully during inspiration and the LEDs on the MEDUtrigger must go out.
9. Switch off device.
10. Close oxygen cylinder.
11. Disconnect pressurized gas supply from device.

3.15 Test communication socket



1. Switch off device.
2. Connect the MEDUtrigger connection to the communication socket on the rear of the device via test adapter WM 20907.
3. Press the CPR key and the alarm mute key simultaneously and keep them depressed.
4. Switch on device.

   The device tests the function in interface mode. During the test, the 0 mbar LED on the ventilation pressure indicator comes on.

   Requirement: The 30 mbar LED (green) must come on for 3 seconds. In addition, the LEDs for mask ventilation and demand flow must come on for 3 seconds. After that, the device should switch on automatically.
5. Switch off device.
6. Disconnect test adapter from device.
7. Press the CPR key and the alarm mute key simultaneously and keep them depressed.
8. Switch on device.

   The device tests the function in interface mode. During the test, the 0 mbar LED on the ventilation pressure indicator comes on.

   Requirement: The 60 mbar LED (red) must come on for 3 seconds. In addition, the LEDs for mask ventilation and demand flow must come on for 3 seconds. After that, the device should switch on automatically.
9. Switch off device.

3.16 Check external condition

1. Check the external condition of the device.

   Requirement:

   The housing is not scratched and has no defects.
   The connecting thread is not damaged and works smoothly.
   The knob is self-inhibited to secure it against unintentional movement.
   Elbow outlet is easy to rotate.

3.17 Documentation

1. Note down items **3.3** to **3.16** as well as the test date and tester number in the test record.
2. Restore the operator's settings:
   - switch audio response on/off
   - switch metronome on/off

4. Servicing

Note:
Remember to perform a final check after every repair.

We recommend that maintenance work such as inspections and repairs be performed only by the manufacturer, i.e WEINMANN, or by qualified technicians expressly authorized by WEINMANN.

4.1 Intervals and scope

Every 2 years:

Every 2 years the device (incl. patient valve, hose system and MEDUtrigger) must undergo **servicing** and be subjected to a **safety check** as specified below.

You can also have servicing and the safety check performed by WEINMANN.

Be sure to check the following items:

- Check equipment for completeness;
- Visual check:
  - Mechanical damage
  - Labelling of controls
  - Damage to all external hoses;
- Renew parts subject to wear / parts requiring compulsory replacement (see "7.2 Service sets" on Page 37);
- Check system components: portable systems, oxygen fittings, secretion suction system, hose connections etc.;
- Check test bag;
- **Final check in accordance with Test Record STK (see "3. Final check" on Page 8 and see "11. Repair and service records" on Page 43).**

Every 4 years:

- Servicing of the fittings in the oxygen supply system (e.g. pressure reducer) either by the manufacturer or by a specialist expressly authorized by the manufacturer.

Every 10 years:

- Repeat testing of conventional steel or aluminium oxygen cylinders by the responsible testing organisation. The repeat testing date is stamped on the shoulder of the cylinder.

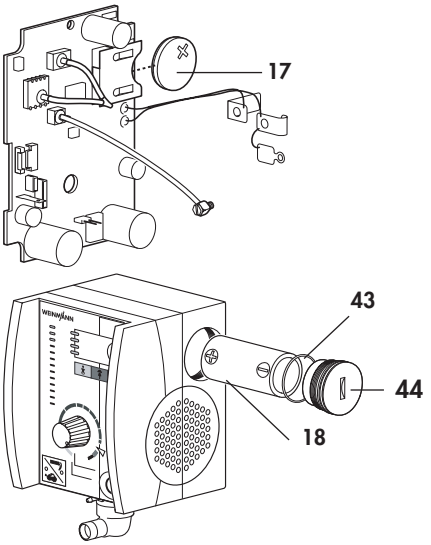
4.2 Batteries

MEDUMAT Easy CPR is equipped with two batteries, a main battery and a button cell. The button cell **17** supplies auxiliary power to the electronic system if the main battery **18** fails. This makes it possible to set off an alarm even if the main battery suddenly fails. The device then switches to exhalation.

In principle, the battery capacity is designed so that under normal conditions of use, it will not need changing in the 2 years between services. The main battery **18** is to be renewed during the 2-yearly service, the button cell **17** only every 4 years.

When changing batteries, special precautions must be taken to protect the electronic circuits (see "6.5 Replacing button cell" on Page 24).

When changing the main battery **18**, you must change the O-ring **43** on the battery compartment cover **44** as well.



17: Button cell for back-up power

18: Lithium battery 3.6 V for main power supply MEDUMAT Easy CPR

4.3 Storage

If you do not intend to use MEDUMAT Easy CPR for a long period, we recommend the following storage precautions:

1. Clean and disinfect the device (see "5. Hygienic Preparation" in the operating instructions).
2. Store MEDUMAT Easy CPR in a dry place.

Important
Remember that devices still require servicing at the specified intervals even when in storage, otherwise they are **not** allowed to be used when removed from storage.

5. Troubleshooting

Fault	Cause	Remedy
MEDUMAT Easy CPR does not start up when switched on	A battery is exhausted	Change main battery **27** (4.2, Page 16), check button cell **26** (3.8.1, Page 10) and replace if necessary (4.2, Page 16)
	Fuse defective	Change board (6.7, Page 26)
	Ribbon cable **X1000** of fascia film is faulty or not connected	Check plug-in connection and cable (6.7, Page 26)
		If necessary, replace upper part of housing (6.11, Page 31)
	On/Off button **10** defective	Change fascia film (6.12, Page 32)
	Board defective	Change board (6.7, Page 26)
	Magnetic valve defective	Change magnetic valve (6.9, Page 29)
MEDUMAT Easy CPR will not switch off	Operating error	Keep On/Off button **10** pressed for at least 2 seconds
	On/Off button **10** defective	Change fascia film (6.12, Page 32)
MEDUMAT Easy CPR is functioning, but without any displays	Pressure gauge hose on MEDUMAT Easy CPR or on patient valve has slipped off	Check pressure gauge hose
	Kink in pressure gauge hose	
	Pressure gauge hose within device is kinked or has slipped off	
V_t too high	Measured without 10 mbar back pressure	Set to 10 mbar back pressure
V_t not correct	Measuring device not calibrated	Calibrate measuring device
	Input pressure > 6 bar	Reduce system setting to less than 6 bar
	Patient valve not in order	Check membranes and O-ring, replace if necessary (Chapter 6.7 of operating instructions)
	Potentiometer wrongly adjusted	Readjust potentiometer (6.10, Page 30)
	Adjuster knob out of adjustment	Readjust adjuster knob (6.10, Page 30)
	Pneumatic block leaking	Replace pneumatic block (6.8, Page 27)

Fault	Cause	Remedy
Pressure limit (P_{max}) not in order	Incorrect setting selected on device	Make correct setting (Chapter 6.5 of operating instructions)
	Patient valve not in order	Check membranes and O-ring, replace if necessary (Chapter 6.7 of operating instructions)
	Patient valve or test bag not correctly connected	Check hose connections and test bag
	V_t not in order	See fault "V_t not in order"
	Hose connections in device not in order	Check hoses, replace if necessary (6.8, Page 27)
	Pressure sensor on board is faulty	Change board (6.7, Page 26)
	Pressure measurement connection blocked	Replace (6.8, Page 27)
Alarms (visual + acoustic) not in order	LED's do not light up	Change board (6.7, Page 26)
	Incorrect indication (Stenosis/ Disconnection)	Check settings, check hose connection to patient valve (Chapter 6.7 of operating instructions)
No visual or acoustic alarm	Board defective	Change board (6.7, Page 26)
No acoustic alarm	Alarm mute pressed?	Wait for between 30 – 120 s
	Speaker defective	Replace speaker (6.6, Page 25)
Alarm < 2.7 bar although pressure present	Pressure sensor defective	Change board (6.7, Page 26)
	Hose connections in device not in order	Check hoses, replace if necessary (6.8, Page 27)
Alarm	Battery failing	Change main battery **27** (4.2, Page 16), check button cell **26** (3.8.1, Page 10) and replace if necessary (4.2, Page 16)
Pressure inlet leaking	Angled connector in device is loose or defective	Check (6.8, Page 27)
Hose system in device is leaking		Check hoses, replace if necessary (6.8, Page 27)
Pressure sensor on board is leaking		Change board (6.7, Page 26)
Mask/tube switch **1** defective		Change fascia film (6.12, Page 32)
Pneumatic block leaking		Replace pneumatic block (6.8, Page 27)
Frequencies not in order	Potentiometer wrongly adjusted	Adjust potentiometer (6.10, Page 30)
	Potentiometer defective	Replace pneumatic block (6.8, Page 27)
Test bag is not filled sufficiently during functional check, Disconnection alarm	Ventilation parameters incorrectly set	Correct ventilation parameters
	Patient valve not working properly	Check lip membrane
	Pressure measurement tube not fitted	Fit pressure measurement tube

Fault	Cause	Remedy
No Stenosis alarm when patient valve closed during functional check (see "Checking the breath volume" in the operating instructions)	Patient valve not working properly	Check lip membrane
The MEDUtrigger does not trigger a respiratory stroke (CPR mode only)	Respiratory stroke triggered during the inspiration and expiration phase	Wait until the expiration phase is over to trigger the respiratory stroke (corresponds to the length of the inspiration phase)
The MEDUtrigger is not working	MEDUtrigger not correctly connected	Check whether the MEDUtrigger connector is correctly positioned and correct it

6. Repair information and instructions

6.1 General

Always perform repairs to MEDUMAT Easy CPR at an ESD-protected workplace.

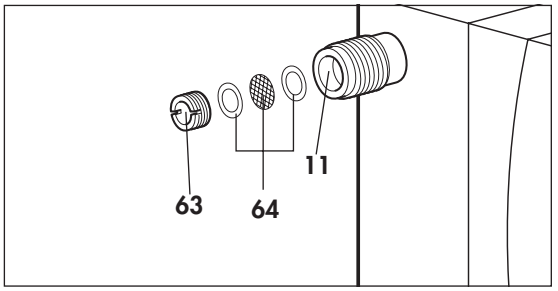
- **Observe the safety information in the Operating Instructions for MEDUMAT Easy CPR.**
- All operations on this device require detailed knowledge and observation of the Operating Instructions and the Service and Repair Instructions.
- Do not carry out any repairs that are not described in these Service and Repair Instructions. This is the only way to guarantee trouble-free functioning of MEDUMAT Easy CPR.
- Make sure that your hands and workplace are clean during the repair work.
- Be sure to carry out a final check after every repair (see "3. Final check" on Page 8).
- If you replace components or individual parts, use only genuine WEINMANN parts.
- When ordering the lower part of the housing **33**, please specify device type, year of manufacture and device number.
- **Note:**
  The item numbers quoted in the following text are identical to the item numbers in the spare parts list on page 35 and the overview on page 4.

6.2 Changing the filter in the pressurised gas connection

Tools and equipment required

- Flat-head screwdriver
- Tweezers.

1. Unscrew the slot-head screw **63** from the pressurised gas connection **11**.
2. Use tweezers to remove filter set **64**.
3. Carefully insert a new filter set **64** in the pressurised gas connection.
4. Screw the slot-head screw **63** firmly into the pressurised gas connection **11**.

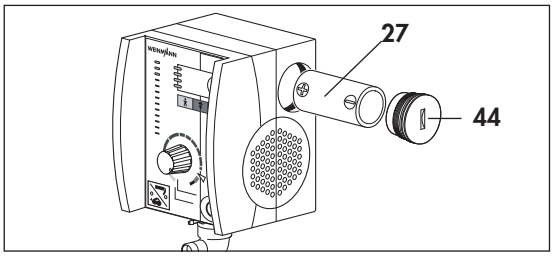


6.3 Open the device

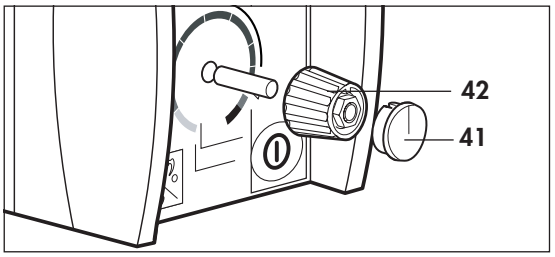
Materials and tools required

- ESD-protected workplace
- Size 1 Phillips screwdriver
- Tubular hexagon box wrench, 10 mm
- Special tool WM 22829 from special tool set WM 15349
- Flat-nose pliers

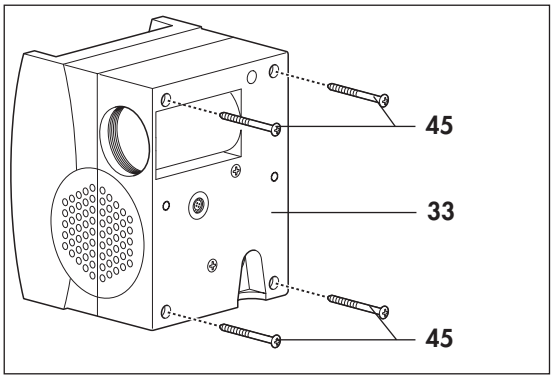
1. Use a coin to open battery compartment latch **44** and remove battery **27**.



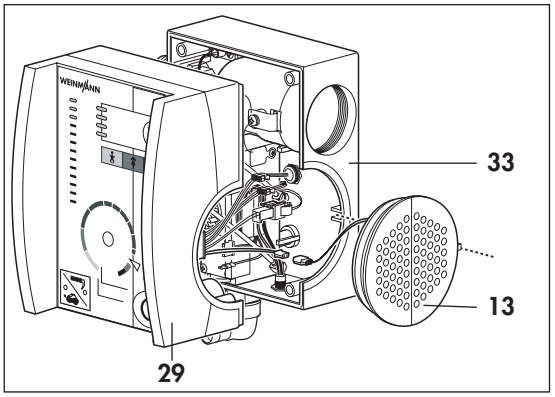
2. Lift off cover **41** of the adjuster knob.
3. Hold adjuster knob **42** steady with the special tool and undo the nut (max. 2 turns) using a tubular hexagon box wrench (10 mm).
4. Pull off adjuster knob **42**.



5. Place the device on a non-slip surface and unscrew the 4 screws **45** from the rear wall of the device.

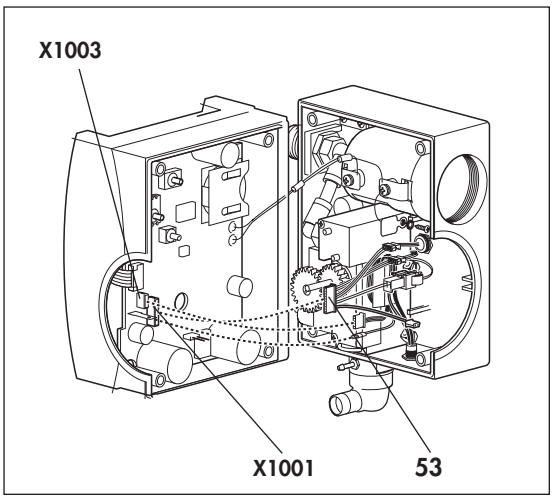


6. Place the device on its side and pull both parts of the housing carefully apart until the retaining pin of the knob is pulled right out of upper part of housing **29**.
7. Take speaker **13** out of lower part of the housing **33** and disconnect the electrical connection.



8. Take the connector for the MEDUtrigger off terminal **X1003** on the board.
9. Detach the connector for cable harness **53** from terminal **X1001** on the board.

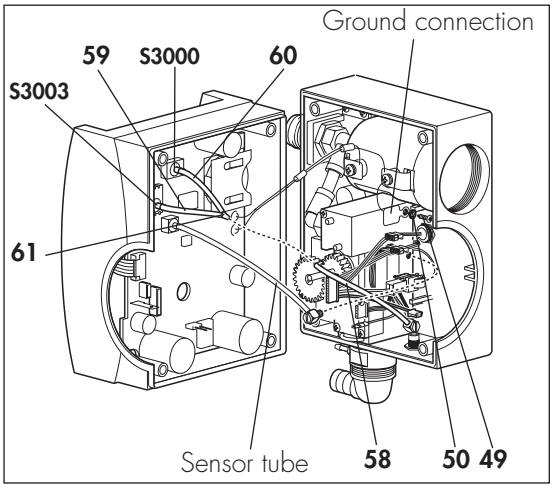
   Note:
   This is most easily achieved using flat-nose pliers. However, under no circumstances damage the board with the flat-nose pliers.

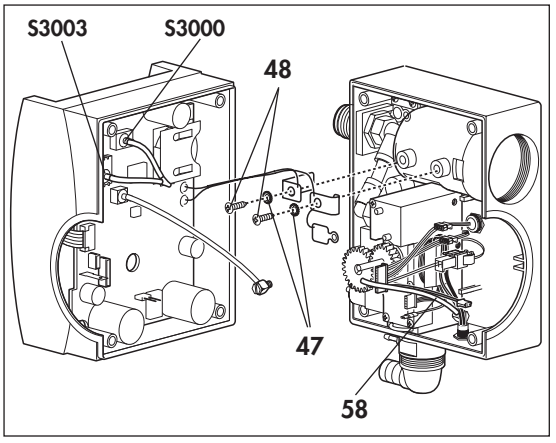


10. Unscrew the sensor tube from the pneumatic block.

    Note:
    The sensor tube may not be pulled by the pressure sensor on the board and this damages it!
11. Separate the long tube **58** of the Y sensor tube from the Y connector **61** with the short tubes (**59** and **60**).
12. Pull the two halves of the housing apart and put them down with the outsides face down.
13. Undo screw **49** with serrated lock washers **50** from the ground connection to the pneumatic block.
14. If the Y sensor tube is damaged: carefully take tube **59** off sensor **S3003** and tube **60** off sensor **S3000** on the board.
15. Unscrew the long tube **58** of the Y sensor tube from the pneumatic block.
16. Undo the two screws **48** with spring rings **47** and pull the battery contacts out of the battery compartment.

    Both halves of the housing are now separated from one another.



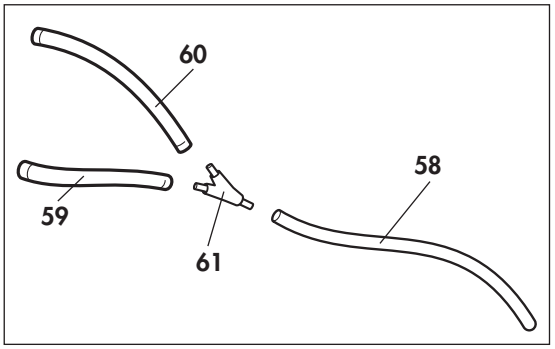


6.4 Close the device

Materials and tools required

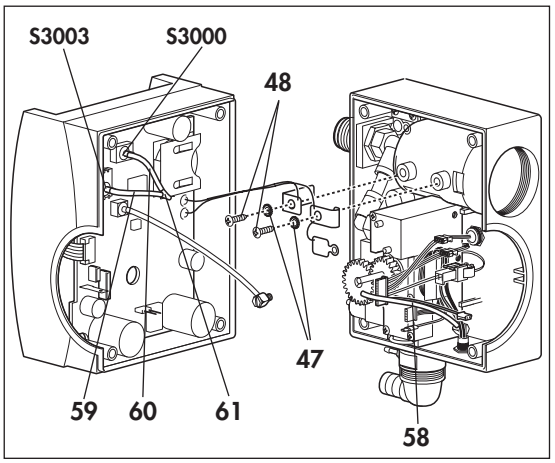
- ESD-protected workplace
- Torque wrench 50 ± 5 Ncm,
- Torque wrench 200 ± 10 Ncm,
- Tubular hexagon box wrench, 10 mm
- Special tool WM 22829 from special tool set WM 15349
- Hex socket wrench, size 2.5

1. Place the two halves of the housing next to one another with the outsides face down.
2. If the Y sensor tube was damaged: push tube **59** (shortest tube) and tube **60** of the new Y sensor tube (tube set WM 15058) together with Y connector **61**.

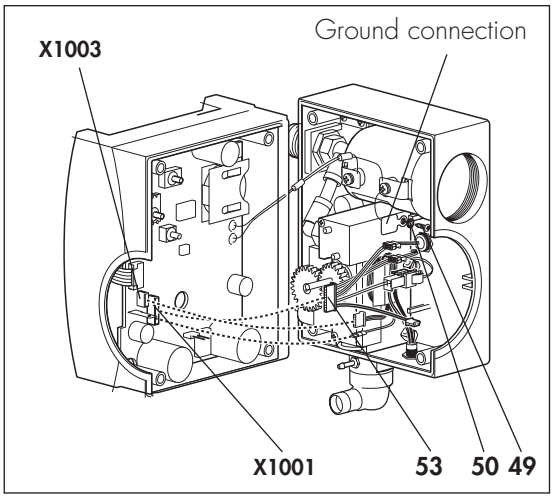


3. Put the battery contacts in the battery compartment and screw them with the two screws **48** and spring rings **47**.

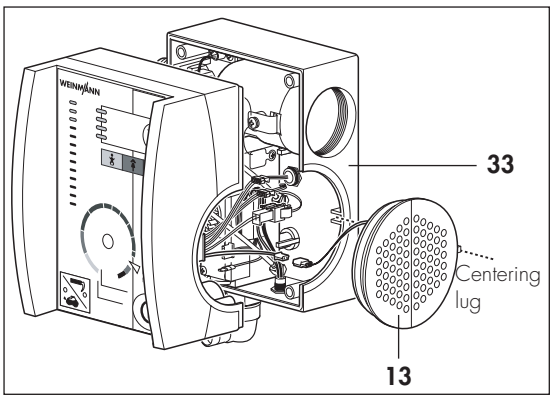
   Note:
   The shortest tube 59 of the Y sensor tube may only be pushed onto sensor S3003, otherwise it may kink!
4. Push tube **59** (the shortest of the three tubes of the Y sensor tube) carefully onto sensor **S3003** and tube **60** onto sensor **S3000** on the board.
5. Screw the long tube **58** of the Y sensor tube to the pneumatic block.



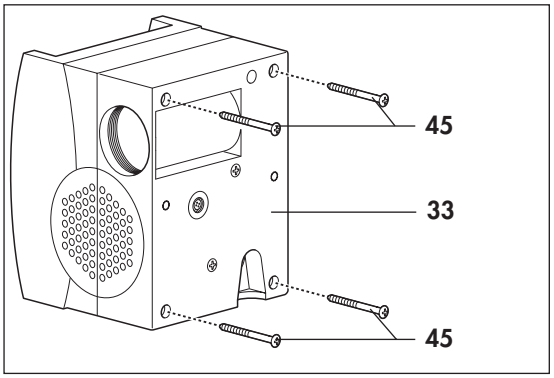
6. Screw the ground connection to the pneumatic block tight using screw **49** and serrated lock washer **50**.
7. Connect long tube **58** of the Y sensor tube to Y connector **61**.
8. Screw the sensor tube to the pneumatic block.
9. Connect the connector for cable harness **53** to terminal **X1001** on the board.
10. Connect the connector for the MEDUtrigger to terminal **X1003** on the board.



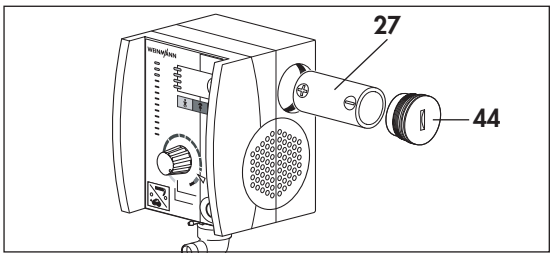
11. Connect the electrical connection for speaker **13** and put it in the opening in the underside of the housing **33**. The centering lug of the speaker must be inserted in the corresponding groove in the underside of the housing.
12. Pass the retaining pin for the knob through the bore in the board and put the two halves of the housing together.



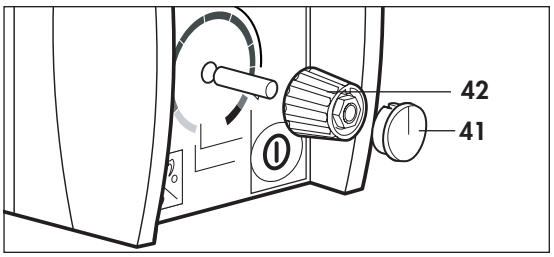
13. Now screw lower part of housing **33** tight using the 4 screws **45** at a torque of 50 ± 5 Ncm.



14. Put battery **27** in the battery compartment and close the cover **44** using a coin. Ensure the correct polarity.



15. Fix knob **42** in position.
    - Push the knob onto the spindle until just before the stop.
    - Hold the knob with the special tool and screw it up at a torque of 200 ± 10 Ncm.



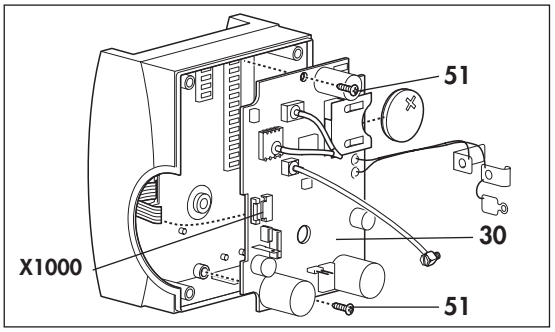
16. Check the display for the knob: at the left-hand stop, the white line should point to the value **Freq. 30, Vt: 0.1 l.**
    If this is not the case, slacken the nut and align the knob.
17. Put cover **41** on knob **42**.
18. Perform a final check (see "3. Final check" on Page 12).

6.5 Replacing button cell

Tools and equipment required

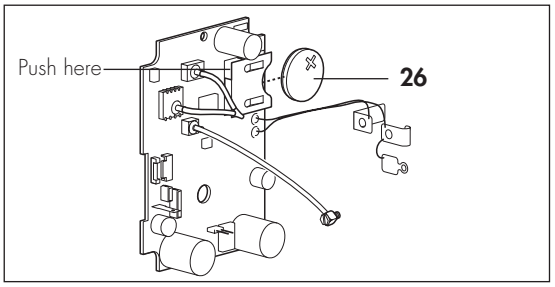
- ESD-protected workplace,
- Phillips screwdriver, size 1,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

1. Open the device (see "6.3 Open the device" on page 30).
2. Release the ribbon cable from its clamp **X1000**: To do so, lift up the top part of the clamp. Then you can pull out the cable.
3. Unscrew the two screws **51** and remove the board **30** from the upper part of the housing.



4. To remove the button cell **26**, use a match or similar to ease it slightly out of the holder and pull the button cell out sideways with the other hand.

   Caution!
   Do not use sharp or pointed objects for this purpose, as this could damage the board.



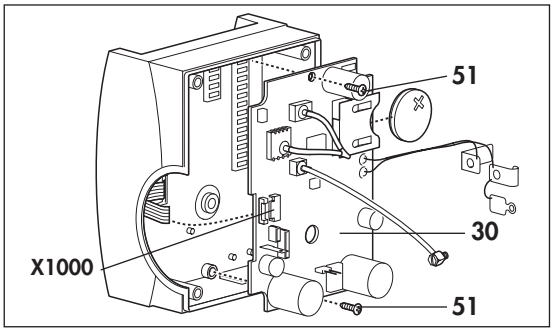
5. Insert a new button cell **26**.

   Make sure it is installed the right way round.

6. Insert the board **30** in the upper part of the housing.

   Make sure that the ribbon cable is not under the board or jammed between it and the housing.

7. Attach the board **30** with the two screws **51**.
8. Place the ribbon cable in the clamp **X1000** on the board and then press down the top part of the clamp.



9. Close the device (see "6.4 Close the device" on page 32). Use a new main battery **27**.
10. Perform a final check (see "3. Final check" on Page 8).

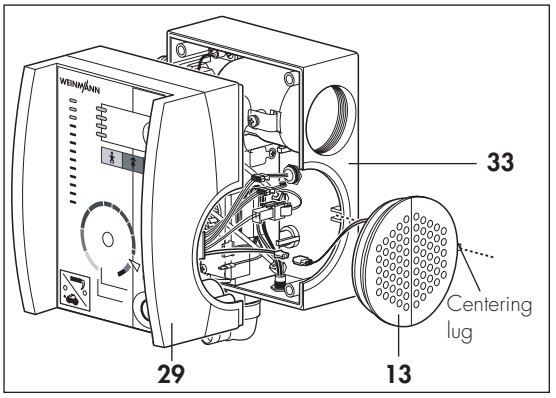
Remember that old batteries must not be disposed of in household waste. Always take old batteries to a local collection point.

6.6 Changing the speaker

Tools and equipment required

- ESD-protected workplace,
- Phillips screwdriver, size 1,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349.

1. Open the device (see "6.3 Open the device" on page 30, steps **1.** to **6.**).
2. Remove the speaker **13** from the lower part of the housing **33** and disconnect the speaker cable plugs.
3. Take the new speaker **13** and connect the speaker cable plugs.
4. Insert the speaker **13** in the recess in the lower part of the housing **33**. The centering lug of the speaker must be located in the corresponding groove in the lower part of the housing.



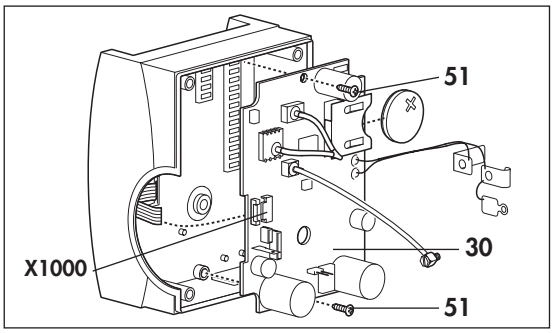
5. Close the device (see "6.4 Close the device" on page 32, steps **14.** to **20.**).
6. Perform the final check (see "3. Final check" on page 8).

6.7 Changing the board

Tools and equipment required:

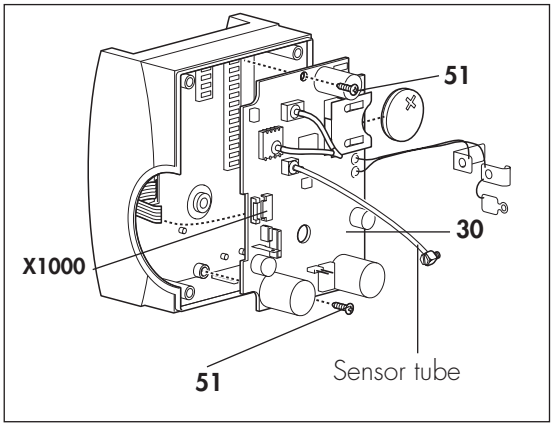
- ESD-protected workplace,
- Phillips screwdriver, size 1,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

1. Open the device (see "6.3 Open the device" on page 30).
2. Release the ribbon cable from its clamp **X1000**: To do so, lift up the top part of the clamp. Then you can pull out the cable.
3. Unscrew the two screws **51** and remove the board **30** from the upper part of the housing.
4. Unscrew the M3 nut from the sensor tube.



5. Place the new board **30** on the spacers..

   Make sure that the ribbon cable is not under the board or jammed between it and the housing.
6. Attach the board **30** with the two screws **51**.
7. Place the ribbon cable in the clamp **X1000** on the board and then press down the top part of the clamp.
8. The screw of the sensor tube is secured with a nut for transport. Remove the nut before screwing the tube to the pneumatic block.
9. Close the device (see "6.4 Close the device" on page 32).
10. Perform a final check (see "3. Final check" on page 8).

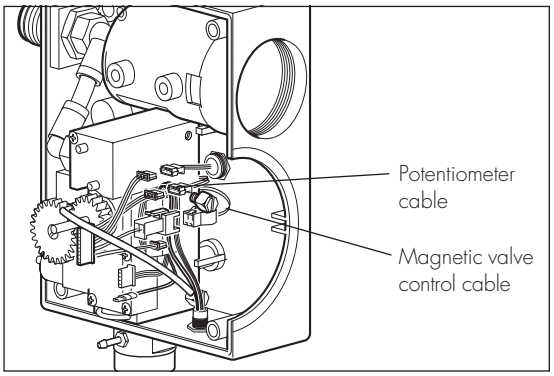


6.8 Replacing the pneumatic block

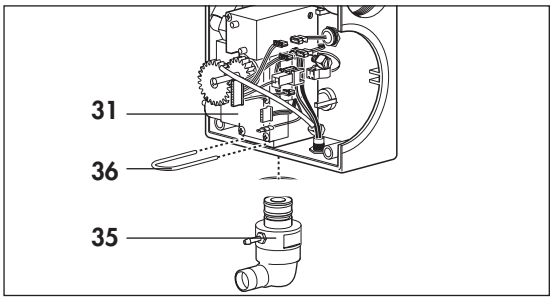
Tools and equipment required:

- ESD-protected workplace,
- Phillips screwdriver, size 2,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

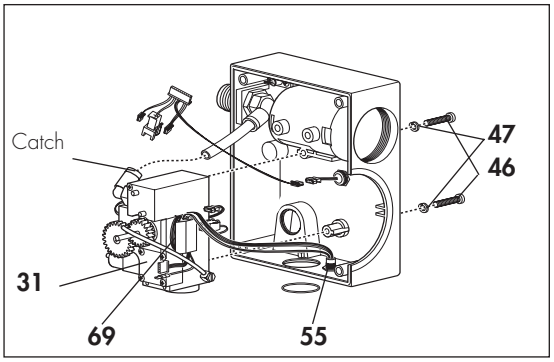
1. Open the device (see "6.3 Open the device" on page 30).
2. Press the catch and unplug the magnetic valve control cable.
3. Unplug the potentiometer cable.



4. Remove the clip **36** from the pneumatic block **31**.
5. Pull the elbow connector **35** off the pneumatic block **31**.

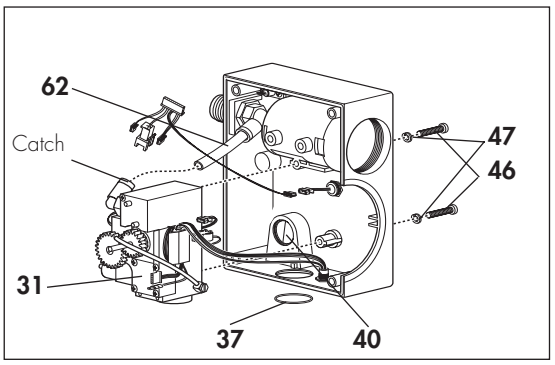


6. Remove cable tie **69**, which fixes the cable for MEDUtrigger socket **55** to the pneumatic block, from pneumatic block **31**. Take the cable out of the bracket.
7. Turn the lower part of the housing over, hold it and the pneumatic block tight and unscrew both screws **46** together with the spring washers **47**.
8. Turn the lower part of the housing over again.

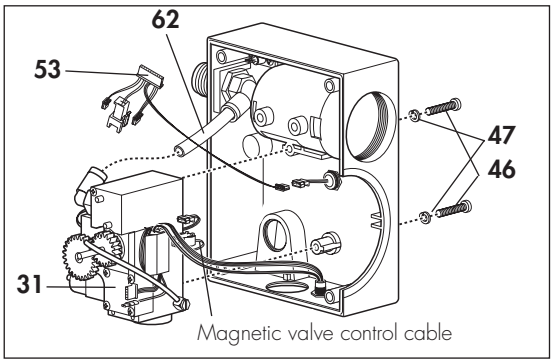


9. Press the catch towards the elbow connector and pull the pneumatic block **31** off the tube **62**.

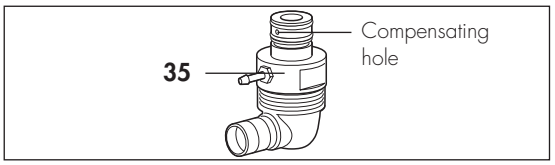
   When you remove the pneumatic block from the lower part of the housing, the O-ring **37** will fall out of the connection. Make sure that the O-ring **40** does not fall out of the relief outlet valve.



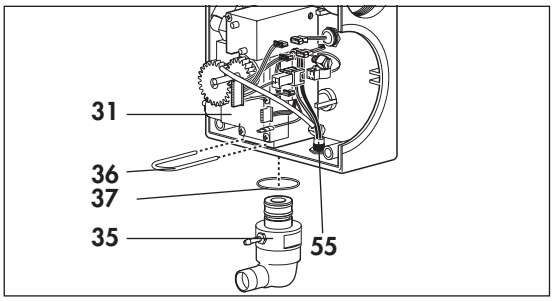
10. When inserting the new or replacement pneumatic block **31**, insert the tube **62** in the elbow connector. In the process, ensure that the solenoid valve control cable and cable harness **53** are routed under the pneumatic block through to the right-hand side.
11. Turn the lower part of the housing over, hold it and the pneumatic block tight and screw up both screws **46** with their spring washers **47**.



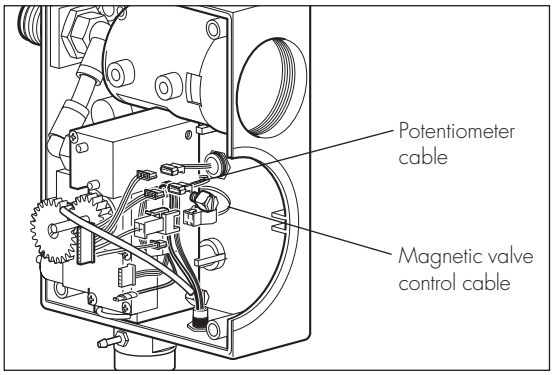
12. Lubricate the O-rings of the elbow connector **35** with a little O_2 lubricant (WM 14298). Make sure that the compensating hole remains free.



13. Insert the O-ring **37** in the groove in the outlet from the pneumatic block.
14. Insert the elbow connector **35** in the pneumatic block **31**.
15. Insert the clip **36** in the pneumatic block **31**.
16. Attach cable for the MEDUtrigger socket **55** to pneumatic block **31** with cable tie **69**.



17. Plug in the potentiometer cable.
18. Plug in the magnetic valve control cable.
19. Close the device (see "6.4 Close the device" on page 32).
20. Perform a final check (see "3. Final check" on page 8).



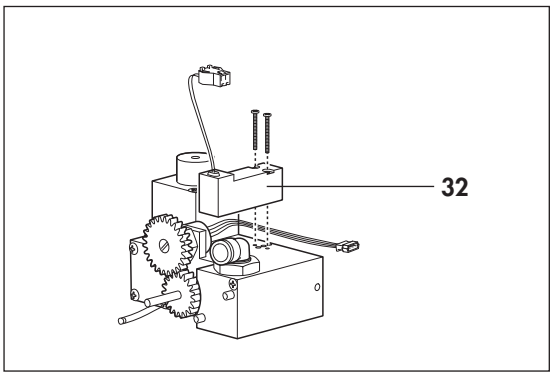
6.9 Replacing the 3/2-way magnetic valve

Tools and equipment required:

- ESD-protected workplace,
- Phillips screwdriver, size 2,
- Phillips screwdriver, size 0,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

1. Open the device (see "6.3 Open the device" on page 30).
2. Remove the pneumatic block (see "6.8 Replacing the pneumatic block" on page 37).
3. Place the pneumatic block on the side with the type plate.
4. Unscrew the two securing screws and remove the 3/2-way magnetic valve **32**.
5. Insert the new 3/2-way magnetic valve **23** in the correct position.

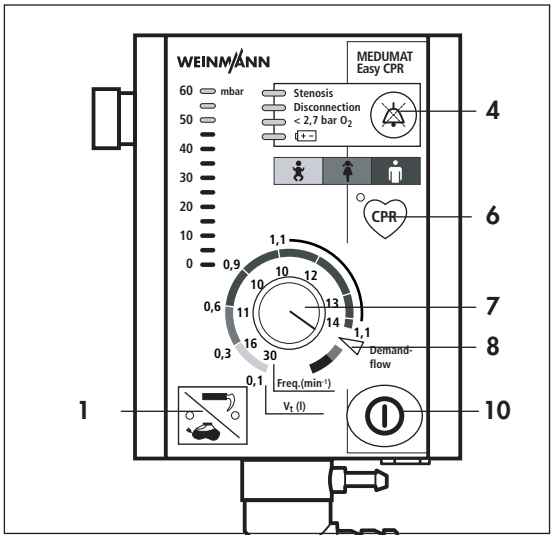
   Make sure that the seal for the 3/2-way magnetic valve is seated in the correct position.
6. Fasten the 3/2-way magnetic valve with the screws supplied with it.
7. Reinstall the pneumatic block (see "6.8 Replacing the pneumatic block" on page 37).
8. Close the device (see "6.4 Close the device" on page 32).
9. Perform a final check (see "3. Final check" on page 8).



6.10 Calibrating the potentiometer (after changing pneumatic block including potentiometer)

When the pneumatic block including potentiometer is changed, the potentiometer must be recalibrated for the board.

1. Make sure the device is switched off.
2. Press the On/Off switch **10** and immediately hold down the alarm mute button **4** and the mask/tube ventilation switch **1**. Then release the button. After a brief interval, the 30 mbar LED on the bar graph indicator lights up.
3. To set the first calibration value, turn the adjuster knob **7** fully to the left to the value **V_t 0,1, Freq. 30**.
4. Press the mask/tube switch **1**. The device now makes a plausibility check.
   - If the value is not correct, all alarm LEDs light up until the correct value is present at the adjuster knob **7** and has been confirmed with the mask/tube ventilation switch **1**. Or you can cancel the potentiometer calibration process by pressing the On/Off switch **10**.
   - If the value is correct, this is indicated by the 0 mbar LED on the bar graph lighting up. You can now set the next value.
5. Turn the adjuster knob **7** fully to the right to the white Demandflow zone.
6. Press the mask/tube switch **1**. The device accepts this value The LED on the bar graph lights up, and you can move on to setting the next value.
7. Turn the adjuster knob **7** back beyond the index point **8** to the ventilation mode zone, then to the right again until it reaches the index point (zone **V_t 1,1, Freq. 14**).
8. Press the mask/tube switch **1** again. The calibration values are stored and the device exits the calibration mode.



Note:

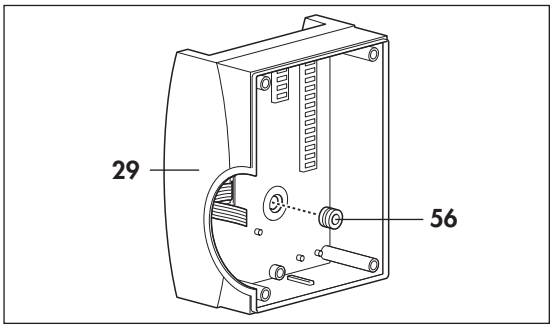
Until the last step the calibration mode can be cancelled at any time by pressing the On/Off switch **10**, without storing the new values. If an invalid value is detected during calibration (all alarm LEDs light up), no value is stored either.

6.11 Changing upper part of housing

Tools and equipment required:

- ESD-protected workplace,
- Phillips screwdriver, size 2,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

1. Open the device (see "6.3 Open the device" on page 30).
2. Remove the board (see "6.7 Changing the board" on page 36, steps **2.** and **3.**).
3. Remove the grommet **56** from the upper part of the housing **29**.



You have now removed all the parts. You can start reassembling.

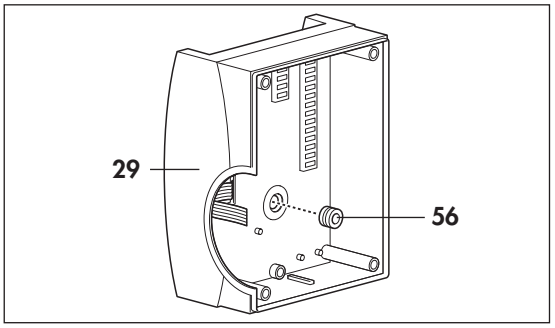
4. Insert the grommet **56** in the new upper part of the housing **29**.
5. Refit the board (see "6.7 Changing the board" on page 36, steps **5.** to **7.**).
6. Close the device (see "6.4 Close the device" on page 32).
7. Perform a final check (see "3. Final check" on page 8).

6.12 Changing the fascia film

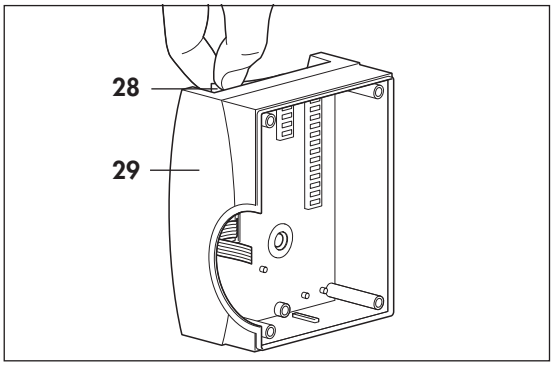
Tools and equipment required:

- ESD-protected workplace,
- Phillips screwdriver, size 2,
- Tubular hexagon box spanner 8 mm,
- Tubular hexagon box spanner 10 mm,
- Torque spanner 50 ±5 Ncm,
- Torque spanner 200 ±10 Ncm,
- Special tool WM 22829 from special tool set WM 15349,
- Flat-nose pliers.

1. Open the device (see "6.3 Open the device" on page 30).
2. Remove the board (see "6.7 Changing the board" on page 36, steps **2.** and **3.**).
3. Remove the grommet **56** from the upper part of the housing **29**.

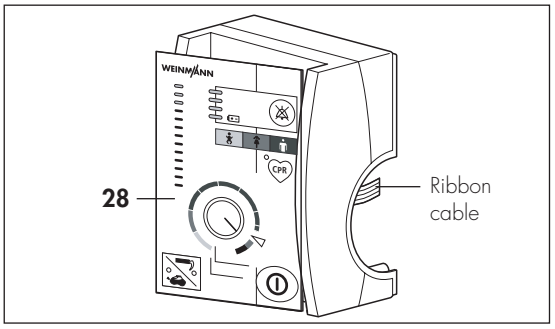


4. From inside the housing, insert the tubular box spanner through the hole for the grommet **56** and press the fascia film **28** outwards until you can grasp it on one side. Then completely remove the fascia film from the upper part of the housing **29**.
5. Use 70% isopropanol to remove all traces of adhesive from the upper part of the housing. Then wait until the isopropanol has completely evaporated from the housing surface.

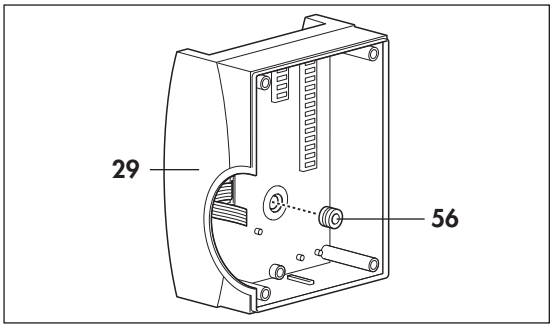


You have now removed all the parts. You can start reassembling.

6. Stick the new fascia film **28** to the upper part of the housing:
   - First position the fascia film on the upper part of the housing on the side where the ribbon cable is attached.
   - Run the ribbon cable through the slit in the upper part of the housing.
   - Then affix the entire fascia film, taking care to avoid bubbles.



7. Refit the grommet **56** in the upper part of the housing **29**.
8. Refit the board (see "6.7 Changing the board" on page 36, steps **5.** to **7.**).
9. Close the device (see "6.4 Close the device" on page 32).
10. Perform a final check (see "3. Final check" on Page 8).

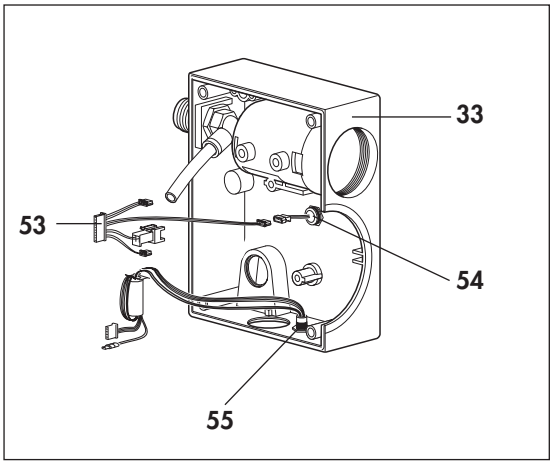


6.13 Replace lower part of housing

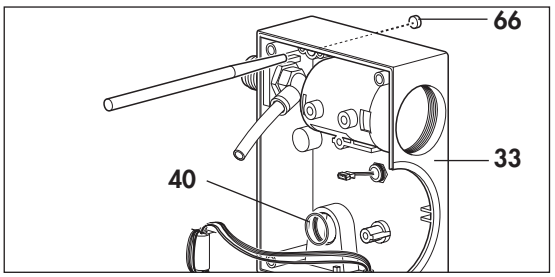
Materials and tools required

- ESD-protected workplace
- Size 2 Phillips screwdriver
- Open-ended wrench, size 10,
- Open-ended wrench, size 13,
- Open-ended wrench, size 14,
- Open-ended wrench, size 22,
- Torque wrench 50 ± 5 Ncm,
- Torque wrench 200 ± 10 Ncm,
- Special counter tool G 3/8 (WM 22827) and special wrench, size 17 (WM 22828) from special tool set WM 15349,
- Allen key for grooved nut M1 x 0.5 (WM 28166)
- Vise with protective jaws
- Flat-nose pliers

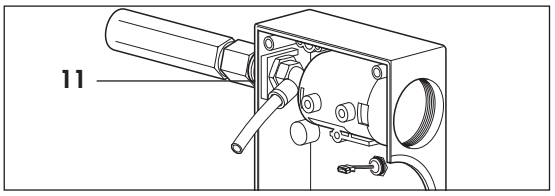
1. Open the device (see "6.3 Open the device" on page 30).
2. Remove the pneumatic block ("6.8 Replacing the pneumatic block" on page 37, steps **2.** to **9.**).
3. Disconnect cable harness **53** from the cable to communication socket **54**.
4. Remove the nut from communication socket **54**. Remove communication socket **54** from the rear of the device.
5. Undo the nut on the MEDUtrigger socket **55** from the outside using the Allen key for grooved nuts.
6. Remove the MEDUtrigger socket **55** from the underside of the device.



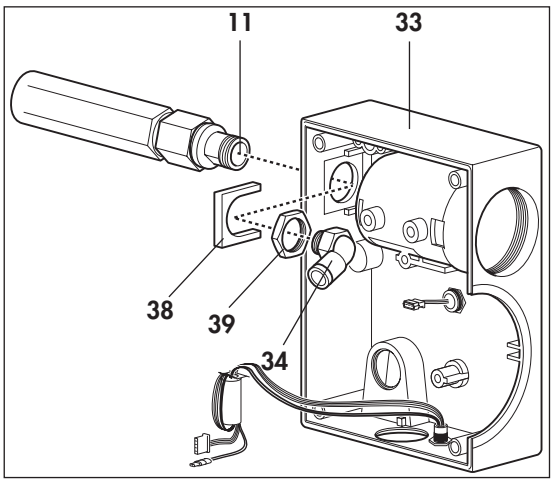
7. Use a sharp object to push the blanking plug **66** of the interface connection out of lower part of the housing **33** from the inside.
8. Take O-ring **40** out of lower part of the housing **33**.



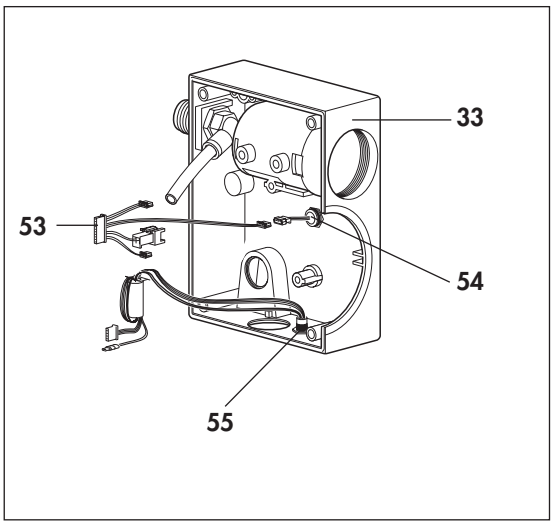
9. Turn the special counter tool onto pressurized gas connection **11**.
10. Clamp the special counter tool in a vise.



11. Turn the nut of the special counter tool against the pressurized gas connection using an open-ended wrench (size 22).
12. Unscrew elbow connector **34** using an open-ended wrench (size 13).
13. Use the special wrench (size 17) to slacken nut **39** and unscrew it completely.
14. Take metal piece **38** off upwards.
15. Put a new lower part of housing **33** on pressurized gas connection **11**.
16. Push metal piece **38** on the inside of the housing onto the connection.
17. Screw nut **39** (size 17) on the inside of the connection tight.
18. Fix elbow connector **34** on the connection.
19. Undo the nut of the special counter tool using the open-ended wrench (size 22).
20. Open the vise.
21. Turn the special counter tool off pressurized gas connection **11**.



22. Pass the cable for the MEDUtrigger socket **55** into the inside of the housing.
23. Tighten the nut on the MEDUtrigger socket **55** from the outside using the Allen key for grooved nuts.
24. Pass the cable for communication socket **54** into the inside of the housing.
25. Tighten the nut on communication socket **54**.
26. Connect the cable for communication socket **54** to cable harness **53**.
27. Push blanking plug **66** into the interface connection from the outside.
28. Put O-ring **40** back in lower part of the housing **33**.



29. Refit the pneumatic block (see “6.8 Replacing the pneumatic block” on page 37, steps **10.** to **18.**).
30. Close the device (see "6.4 Close the device" on page 32).
31. Perform a final check (see "3. Final check" on page 12).

7. Spare parts

7.1 Spare parts list

Note:

The item numbers in the following table are identical to the numbers in the text of these Service and Repair Instructions and in the Operating Instructions. The instructions for use can be found at www.weinmann.de.

Pos.-Nr.	Bezeichnung	Bestell-Nr.
11	Pressurised gas connection (threaded), preassembled	WM 22685
13	Speaker – Seal	WM 28077 WM 28066
16	Ventilation hose	WM 22647
17 **18** **19** **20** **21** **22** **23** **24**	Patient valve, comprising: – bottom part of control unit for spontaneous breathing – Membrane for Spontaneous breathing tube – insert for spontaneous breathing tube – O-ring 15-1,5 – Disc membrane Exhalation tube – Lip membrane – top part of control unit – tube connection for patient valve	WM 3280 WM 3281 WM 3284 WM 3282 WM 1145/118 WM 3212 WM 3211 WM 3181 WM 3213
25	MEDUtrigger, complete	WM 20900
26 **27**	– Button cell CR 2430 – Battery 3.6 volt	WM 22652 WM 28045
28	Fascia film for MEDUMAT Easy CPR Fascia film for MEDUMAT Easy CPR FR	WM 28142 WM 28143
29	Upper part of housing with fascia film for MEDUMAT Easy CPR* consisting of: – upper part of housing with fascia film – device information plate – label for patient connection Upper part of housing with fascia film for MEDUMAT Easy CPR, FR* consisting of: – upper part of housing with fascia film – device information plate – label for patient connection	WM 28200 WM 28201
30	Printed circuit board, MEDUMAT Easy CPR, DE, GB, FR, IT, NL, ES, PT, DK, SE, NO, FI, IS Printed circuit board, MEDUMAT Easy CPR, RU, PL, CZ, CN, JP, ARE, DE, GB, TR, TH, IND	WM 28170 WM 28180
31	Pneumatic block, complete, new	WM 28025
32	3/2 valve for MEDUMAT Easy and MEDUMAT Easy CPR	WM 28035

33	Lower part of housing, MEDUMAT Easy CPR, DE, GB, FR, IT, NL, ES, PT, DK, SE, NO, FI, IS, Service* comprising: – Lower part of housing – Rating plate – Label for O_2 input – Label for excess pressure valve – Label for battery position – Label for MEDUtrigger Lower part of housing, MEDUMAT Easy CPR, RU, PL, CZ, JP, ARE, TR, ID, TH, IR, DE, Service* comprising: – Lower part of housing – Label for O_2 input – Label for languages – Label for excess pressure valve – Label for battery position – Label for MEDUtrigger	WM 28202 WM 28203
34	Elbow connector, pressure connection	WM 22552
35	Elbow connector ventilation hose, complete – Hose connection for patient valve	WM 28057 WM 3213
36	Clip for elbow connector	WM 28052
37	O-ring, elbow connector	WM 1145/141
38	Torque plate in pressure connection	WM 22509
39	Nut for pressure connection	WM 22586
40	O-ring, pressure relief valve	WM 1145/3
41	Cover for adjuster knob, gray	WM 22941
42	Short knob	WM 4891
43	O-ring for battery compartment lid	WM 1145/145
44	Battery compartment latch, complete	WM 28046
45	Fillister head screw 30 x 40 mm for housing	WM 58347
46	Fillister head screw M3 x 16mm for pneumatic block	WM 53033
47	Spring ring DIN 127 for attaching pneumatic block and battery contacts	WM 50350
48	Fillister head screw KB 35 x 8 for battery contacts	WM 58350
49	Cheese-head screw M3 x 6 for earth connection	WM 50594
50	Serrated washer for earth connection	WM 51850
51	Fillister head screw KB 30 x 6 for board	WM 23159
52	Fillister head screw KB 25 x 6 for interface cable, lower part of housing	WM 58320
53	Cable harness	WM 28196
54	Communication socket with cable	WM 28198
55	MEDUtrigger socket with cable	WM 28197
56	Grommet	WM 4112
57	Oxygen inlet tube, 40 mm long	WM 28095

58 **59** **60** **61** **62**	Set, MEDUMAT tubes, consisting of: – tube, silicone, 65 mm long – tube, silicone, 25 mm long – tube, silicone, 35 mm long – Y connector – oxygen inlet tube, 42 mm long	WM 15058
63	Pressure screw	WM 1158
64	Screen set, consisting of: – screen – sealing washer 3.5 x 6 x 0.5	WM 15284
65	Service label for servicing in 2 years	WM 75340
66	Blanking plug for interface connection, lower part of housing	WM 1504
67	Label for O_2 inlet	WM 0791
68	Label, relief valve	WM 0792
69	Cable tie	WM 28164

* When placing an order, make sure to include type, unit serial no. and year built.

7.2 Service sets

Overview

Years	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**
Service set	WM 15463	WM 15462	WM 15463	WM 15464	WM 15463	WM 15465	WM 15463	WM 15464

Service set 2, 6, 10 and 14 years

Set, WM 15463
comprising:

- Battery
- Lip membrane
- Membrane for test connector
- Membrane for spontaneous breathing tube
- Membrane for exhalation tube
- Sealing washer 3.5 x 6 x 0.5
- Filter
- O–ring 15 x 1.5

Service set 4 years

Set, WM 15462
comprising:

- Set WM 15463
- Button cell

Service 8 and 16 years

Set, WM 15464

comprising:

- Set WM 15463
- Button cell
- Seal for speaker
- Set, tubes
- Pneumatic block
- 2x O–ring 11 x 1.5 for elbow outlet

Service 12 years

Set, WM 15465

comprising:

- Set WM 15463
- Printed circuit board (PCB)
  MEDUMAT Easy CPR WM 28170
- O-ring 26 x 2 for battery compartment lid

8. Tools and Test Equipment

This section lists all the tools and test equipment mentioned in these Service and Repair Instructions.

The specific tools and test equipment required in each case are listed in the individual chapter.

You can obtain special tools from WEINMANN.

8.1 General tools

- Flat-head screwdriver, size 0.5 x 3 x 100;
- Phillips screwdriver, size 0;
- Phillips screwdriver, size 1;
- Phillips screwdriver, size 2;
- Open-ended spanner, 13 mm, for elbow connector at O_2 inlet;
- Open-ended spanner, 22 mm, for special counter tool;
- Vice with jaw protectors, countering threaded connection;
- Tubular hexagon box spanner 10 mm, for adjuster knob;
- Tubular hexagon box spanner 8 mm, for fascia film;
- Tweezers, for filter set;
- Diagonal cutter;
- Flat-nose pliers;
- Allen key, 2.5 mm.
- Torque spanner 50 ±5 Ncm;
- Torque spanner 200 ±10 Ncm.

8.2 Special tools

The following tools can be obtained from WEINMANN:

- Special tool set, comprising: WM 15349
  - Special counter tool G 3/8, for countering threaded connection at O_2 inlet WM 22827
  - Special spanner, 17 mm, for counter nut at O_2 inlet; WM 22828
  - Special tool, for holding securing adjuster knob. WM 22829
  - Set, hose with syringe WM 15359
  - Special pliers WM 22928
- Test adapter WM 20907
- Allen key for grooved nut M1 x 0.5 WM 28166

8.3 Testing equipment

- Oxygen concentration meter, type Oxycontrol WM 13550
- Volume flow meter

  Typ Flow Analyser PF-300

  obtainable from:
  imtmedical ag
  Gewerbestraße 8
  CH-9470 Buchs

  Tel.: + 41 81 750 66 99
  Fax: + 41 81 750 66

  www.imtmedical.com

  or

  Type RT 200 (Timeter)

  obtainable from:
  Allied Healthcare Products Inc.
  1720 Sublette Avenue
  St. Louis, Missouri, MO 63110
  USA

  Tel.: 001-800-444-3954
  Fax: 001-314-771-5183

  or

  Type EKU VIP ventilator tester

  obtainable from:
  EKU Elektronik GmbH
  Feldstraße 9a
  D-56291 Leiningen

  Tel.: 0049 6746-1018
  Fax: 0049 6746-8484
  www.eku-elektronik.de

- Test set for final check WM 15357
- Set, supply test
  Medumat/Modules WM 15440
- Set, test set ventilation and pressure reducer
  flow WM 15443
- Pressure gauge 0 to 6.3 bar, class 1.6;
- Pressure gauge 0 – 100 mbar, class 1.6

  Type WIKA

  obtainable from:
  Alexander Wiegand GmbH & Co.
  Alexander-Wiegand-Strasse 30
  D-63911 Klingenberg am Main
  Germany

  Tel.: 0049 9372/1320

- Digital multimeter
- Hazet torque wrench
  obtainable from:

  Hommel
  Heidelberger Str. 52
  D-68519 Viernheim
  Germany

  Tel.: 00 49 6204/738-0
  Fax: 00 49 6204/739-222

9. Technical data

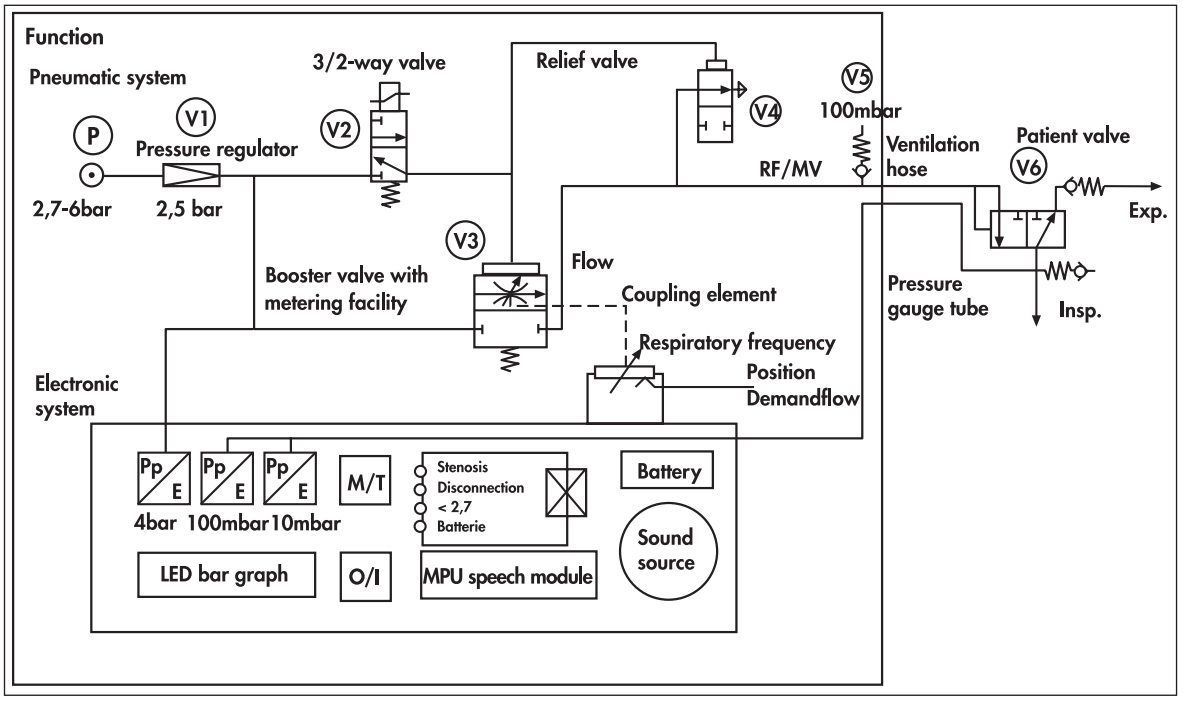
	MEDUMAT Easy CPR
Product category according to 93/42/EEC	II b
Dimensions L x W x H	100 x 145 x 90 incl. connections
Weight incl. accessories	approx. 0.6 kg
Operation: – Temperature range – Humidity – Air pressure	 -18°C to +60°C max. 95 % 70 kPa to 110 kPa
Storage	-40°C to +70°C
Electromagnetic compatibility acc. to EN60601-1-2: 2007 and EN 794-3: 1983 – Radio interference suppression – Radio interference resistance	(the test parameters and threshold values are obtainable from the manufacturer on request) EN 55011 EN 61000-4-2 to 3
Control	Timing pulse, volume constant
Gas input	Medicinal oxygen
Operating pressure	2.7 to 6.0 bar
Minimum gas volume required	70 l/min O_2
Insp-exp. ratio	1:1.67
Ventilation frequency	Continuously variable from 10 to 30 min^{-1}
Tidal volume (V_t) Tolerances V_t: – room temp. (20 °C) – -18 °C to +60 °C	infinitely adjustable from 0,1 bis 1,1 l for 0,1 l = ±20% for >0,1 l = ±15% for 0,1 l = ±35% for >0,1 l = ±20%
Max. ventilation pressure	20 or 45 mbar
O_2 concentration	100% O_2
Pressurized gas connection	External thread G 3/8
Ventilation hose connection	External diameter 13 mm

	MEDUMAT Easy CPR
Patient valve – Inspiration tube	15 mm socket 22 mm plug ISO 5356-1
Patient valve – Expiration tube	30 mm socket ISO 5356-1
Power supply Life expectancy Max. storage period	Maintenance-free lithium battery 3.6 V; 5.2 Ah, > 2 years 10 years after delivery
Auxiliary power for alarm system Max. storage period	Button cell CR 2430 10 years after delivery
Fuse F1	T 500 L 250 V
Ventilation hose	Spiral silicone NW 10
Degree of protection against water and dust	IP 54
Standards complied with	EN 794-3; EN 60601-1 EN 1789 ISO 10651-3
Alarm sound pressure	60 dB (A)
Accuracy of ventilation pressure measurement	±5% of upper range value
Resistance, patient valve (under EN 794-3): – Inspiration – Expiration – Spontaneous breathing	 <6 mbar at 60 l/min <6 mbar at 60 l/min <1.5 mbar at 30 l/min
Elasticity of breathing system	Negligible
Patient valve dead space	12.8 ml
Components with critical flow direction	Patient valve
Components containing latex	None

Subject to technical change without notice.

CE 0197

9.1 Pneumatic / electronic systems



The input pressure at p is max. 6bar. This is dynamically reduced by V1 to 2.5 bar. This is the input pressure at V2, V3 and V4.

Inspiration

An electrical impulse to V2 opens V3 and closes V4. Oxygen flows through the ventilation hose to the patient valve. If the ventilation pressure in the patient valve reaches >100 mbar, the relief valve V5 will open.

Expiration

A fresh electrical impulse closes V2. The relief valve V4 opens and vents the ventilation hose. The patient breathes out through the patient valve.

Demandflow

An inspiration impulse (trigger) at V2 opens valves V3 and V4.

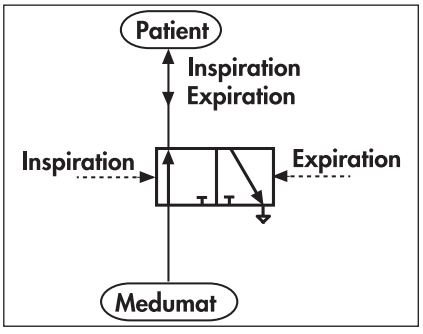
Electronic system

The microprocessor-controlled electronic system sets the ventilation parameters and monitors ventilation, and also O_2 supply and power supply. If necessary, a visual and acoustic alarm is given. The ventilator has an audio response facility that can be switched on for user guidance.

Patient valve

During inspiration the ventilation gas flows to the patient.

During expiration the expiration pressure switches the valve so that the patient can breathe out.



10. Technical Changes

Technical Changes	From Device No.	Date

11. Repairs and maintenance protocols

Device master data	Service and repair work carried out in accordance with service instructions	
Manufacturer: WEINMANN GmbH + Co. 22525 Hamburg Device type: **MEDUMAT Easy CPR** Order No.: _____ Date of manufacture: _____	**Measures / Comments**	Service performed in accordance with MEDUMAT service instructions
Safety check - 2 years _____		Company _____ Date _____ Signature
Safety check - 4 years _____		Company _____ Date _____ Signature
Safety check - 6 years _____		Company _____ Date _____ Signature
Safety check - 8 years _____		Company _____ Date _____ Signature
Safety check - 10 years _____		

Test record

as per Servicing and Repair Instructions WM 67308 (Medumat Easy CPR)

Device type:	MEDUMAT Easy CPR WM 28140
Type of device:	Emergency ventilator
Serial no.:	
Manufacturer:	Weinmann GmbH + Co. KG
Date of manufacture:	
Owner/operator:	

Record of tasks performed

☐ Repair performed

☐ Servicing performed

Service interval: ☐ 2 years

☐ Safety check [STK] performed (**only required in Germany**)

Safety check [STK] interval: ☐ 2 years

Note The safety check [STK] is no substitute for the necessary servicing nor for the preventive replacement of wear parts.

Test result: The device conforms to the requirements of § 6 of the Medizinprodukte-Betreiberverordnung [German law governing medical devices and their owners/operators].

Date Signature

WM 28205 - 04/10

Geräte für Medizin GmbH+Co. KG, P.O. Box 54 02 68, D-22502 Hamburg, Germany, Fax +49 4054 702461,
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Test record

as per Servicing and Repair Instructions WM 67308 (Medumat Easy CPR)

	Preparation	
3.1.	**Testing equipment** (as per Servicing and Repair Instructions WM 67308)	
3.2.	**Preparation for the final check** (as per Servicing and Repair Instructions WM 67308)	
3.3.	**Enter device data**	

	Tests				
3.4.	**Check for leaks and check pressure display**			OK	NOK
3.4.1.	Check for leaks on inlet side				
	• Drop in pressure is less than 0.2 bar/min			☐	☐
3.4.2.	Check for leaks in pressure measuring section				
	• Drop in pressure is less than 2 bar/min			☐	☐
3.5.	**Self-test after device is switched on**			OK	NOK
	• The self-test runs without errors			☐	☐
3.6.	**Function check of controls (key test)**			OK	NOK
	• All the controls work perfectly			☐	☐
3.7.	**Function check and alarms**			OK	NOK
3.7.1.	Test stenosis alarm				
	• The stenosis alarm is correctly triggered			☐	☐
3.7.2.	Test alarm acknowledgement				
	• The acoustic alarm is suppressed immediately, the visual alarm remains active			☐	☐
3.7.3.	Test disconnection alarm				
	• The disconnection alarm is correctly triggered			☐	☐
3.7.4.	Test pressure alarm				
	• The pressure alarm is correctly triggered			☐	☐
3.7.5.	Test demand mode LED				
	• The LED must come on/flicker			☐	☐
3.7.6.	Test audio response				
	• The audio response must be clear and intelligible.			☐	☐
3.8.	**Battery voltage**			OK	NOK
3.8.1	3.0 V battery (board)				
	• Battery voltage is between 3.0 and 3.2 V		V	☐	☐
3.8.1	3.6 V battery (battery compartment)				
	• Battery voltage is between 3.4 and 3.7 V		V	☐	☐

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3.9.	**Function check of frequency setting**			OK	NOK
	• Frequency 14 ± 2 min^{-1}		min^{-1}	☐	☐
	• Frequency 10 ± 2 min^{-1}		min^{-1}	☐	☐
	• Frequency 30 ± 2 min^{-1}		min^{-1}	☐	☐
3.10.	**Function check of breath volume at 4.5 bar input pressure and 10 mbar back pressure**			OK	NOK
	• Breath volume 1140 ± 170 ml		ml	☐	☐
	• Breath volume 1100 ± 170 ml		ml	☐	☐
	• Breath volume 100 ± 20 ml		ml	☐	☐
3.11.	**Test O_2 concentration**			OK	NOK
	• O_2 concentration must be > 98 % by volume			☐	☐
3.12.	**Function check of pressure limit**			OK	NOK
	• Pressure limit 20 ± 5 mbar		mbar	☐	☐
	• Pressure limit 45 ± 5 mbar		mbar	☐	☐
3.13.	**Function check of venting valve without patient valve**			OK	NOK
	• The ventilator vents audibly			☐	☐
3.14.	**Test the MEDUtrigger**			OK	NOK
	• LEDs on Medutrigger come on			☐	☐
	• LEDs on Medutrigger go out			☐	☐
3.15.	**Test communication socket**			OK	NOK
	• The communication test runs without errors (green 30 mbar LED comes on)			☐	☐
	• The communication test runs without errors (red 60 mbar LED comes on)			☐	☐
3.16.	**Check external condition**			OK	NOK
	• Housing not scratched and has no defects			☐	☐
	• Connecting thread undamaged and working smoothly			☐	☐
	• Knob inhibited to prevent unintentional adjustment			☐	☐
	• Elbow outlet is easy to rotate.			☐	☐

WEINMANN medical technology

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Test record

as per Servicing and Repair Instructions WM 67308 (Medumat Easy CPR)

	Check equipment and accessories (system components)	Present		OK	NOK
		No	Yes		
	• Patient circuit with patient valve undamaged and in working order	☐	⇨	☐	☐
	• Test set for function check complete	☐	⇨	☐	☐
	• Pressure reducer in working order	☐	⇨	☐	☐
	• O2 cylinder within test period, valve in working order	☐	⇨	☐	☐
	• Carrying platform complete and in working order	☐	⇨	☐	☐
	• Medical devices book (Germany only)	☐	⇨	☐	☐
	• Instructions for use	☐	⇨	☐	☐

Test performed:

Date Signature

WM 28205 - 04/10

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